EUROQUARTZ

PRODUCT SPECIFICATION

MTTF CALCULATION FOR SEAM SEALED CRYSTALS

Based on operation +25°C

SAMPLE TYPES:
MQ (7 x 5mm)
MF (6 x 3.5mm)
MJ (5 x 3.2mm)
X42 (4 x 2.5mm)
MT (3.2 x 2.5mm)
X32 (3.2 x 2.5mm)
X22 (2.5 x 2.0mm)

NUMBER OF PARTS TESTED: 3170 pieces
NUMBER OF FAILURES: 0 pieces
ACCELERATED TEMPERATURE: +125°C
TEST HOURS: 1000 hours

ARRHENIUS MODEL

Symbol	Description	Formula / Value
AF	Acceleration Factor	$AF = e^{\left(\frac{Ea}{K}\right)\cdot\left(\frac{1}{T_1}-\frac{1}{T_2}\right)}$
Ea	Activation Energy	0.437 eV
K	Boltzmann's Constant	8.617×10^{-5} eV/K
T_1	Operating Temperature (K)	+25°X = 298°K
T_2	Accelerated Temperature (K)	+125°C = 398°K
T_t	Total Device Hours	= (number of devices) x (test hours at T_2)
X^2	Chi-squared	For zero failure 1.833 at 60% confidence level 4.605 at 90% confidence level
MTTF	Mean Time to Failure	$=(2 \times AF \times Tt) / X^2$
FIT	Failures in Time	$= 10^9$ / MTTF

According to above formulae, MTTF and FIT are calculated as follows:

Confidence Level	MTTF (Hours)	FIT
60%	**2.48×10^8**	**4.02**
90%	**9.89×10^7**	**10.11**

EUROQUARTZ LIMITED Blacknell Lane CREWKERNE Somerset UK TA18 7HE
Tel: +44 (0)1460 230000 Fax: +44 (0)1460 230001 info@euroquartz.co.uk www.euroquartz.co.uk