ECLIPTEK® CORPORATION

Qualification and Reliability Report

Series: EQRE33

Qualification Tests				
Test	Method/Condition	Test	Pass	Fail
Aging	Biased, Nominal V_{DD}, Temperature = 85°C, Duration = 30 days	100	100	0
Autoclave	JESD22-A102, 121°C, 100% RH, 15 PSIG, 96 hours	100	100	0
ESD Susceptibility	MIL-STD-883, Method 3015, Class 1, HBM = 1,500V	10	10	0
Flammability	UL94-V0	10	10	0
Hermeticity – Fine Leak	MIL-STD-883, Method 1014, Condition A	100	100	0
Hermeticity – Gross Leak	MIL-STD-883, Method 1014, Condition C	100	100	0
High Temperature Operating Life	MIL-STD-883, Method 1005, Condition B, Biased, 125°C, 1,000 hours	100	100	0
High Temperature Storage	MIL-STD-883, Method 1008, Condition C, 125°C, 168 hours	100	100	0
Highly Accelerated Temperature and Humidity Stress Test	JESD22-A110, Biased, 130°C, 85% RH, 96 hours	100	100	0
Latchup	JESD17, 200mA @ 25°C	10	10	0
Mechanical Dimensions	Per Datasheet	25	25	0
Mechanical Shock	MIL-STD-883, Method 2002, Condition B, 1,500G's, 0.5msec, ½ sine	100	100	0
Moisture Sensitivity Level	J-STD-020, MSL = 1, 260°C	100	100	0
Resistance to Soldering Heat	MIL-STD-202, Method 210, Condition K	100	100	0
Resistance to Solvents	MIL-STD-202, Method 215	100	100	0
Solderability	MIL-STD-883, Method 2003	100	100	0
Temperature Cycle	MIL-STD-883, Method 1010, Condition B, -55°C to +125°C, 10 cycles	100	100	0
Vibration	MIL-STD-883, Method 2007, Condition A, 20G's	100	100	0

Reliability Tests				
Test	Method/Condition	Test	Pass	Fail
Vibration	MIL-STD-883, Method 2007, 20 G's	8,215	8,215	0
Mechanical Shock	MIL-STD-883, Method 2002, Condition B, 1,500G's, 0.5msec, ½ sine	8,215	8,215	0
Temperature Cycle	MIL-STD-883, Method 1010, Condition B, -55°C to +125°C, 10 cycles	8,215	8,215	0
Aging	Biased, Nominal V_{DD}, Temperature = 85°C, Duration = 720 hours	8,215	8,215	0

Reliability Data		
Characteristic	*Constant*	*Value*
Number of Units	*N*	8,215
Hours Tested	*t*	720
Activation Voltage	*Ea*	0.4eV
Boltzmann's Constant	*k*	8.62×10^{-5}
Aging Temperature	*T1*	85°C
Ambient Temperature	*T2*	25°C
Confidence Level	$X^2_{(CL,\ 2\ dof)}$	90%

Reliability Calculations	
Parameter	***Value***
Failures in Time (*FIT*)	**29 units / 1 x 10^9 Hours**
Mean Time To Failure (*MTTF*)	**34,925,000 hours / Failure**

$$FIT = \frac{(\chi^2/2)\cdot 1{,}000{,}000{,}000}{\sum\left[f_i \cdot t_i \cdot e^{\frac{Ea}{k}\cdot\left(\frac{1}{T1+273}-\frac{1}{T2+273}\right)}\right] + \left[N \cdot t \cdot e^{\frac{Ea}{k}\cdot\left(\frac{1}{T1+273}-\frac{1}{T2+273}\right)}\right]}$$

$$MTTF = 1{,}000{,}000{,}000 / FIT$$

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