Reliability Report

Mean-Time-Between-Failure Prediction
MIL-HDBK-217F, FN2

for

SREGS-400U-02
with Basic Charging Module
and two HV400s

Prepared by:

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SREGS-400U-02_a.pdf
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Revision A

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Description of Equipment

The Mean-Time-Between-Failure Prediction contained herein has been prepared for the SREGS-400U-02. This equipment consists of a multiple printed circuit board assembly, as follows.

Sub-assembly	Quantity
PS, SREGS-400U-02	1
Charging Module	1
HV400 Module	2

Assumptions and Conditions

This calculation relates to operational hours, as opposed to elapsed hours, so this should be reflected in the overall reliability if required.

Models provided by the MIL-HDBK-217F, Field Notice 2 (FN2), Specification for Reliability Prediction were used, except where manufacturer's failure rate data was available.

Ambient temperature = 25 ^{o}C

Model = Serial, redundant paths do not exist.

Component Quality Level = Commercial

Calculation Method = Limited Stress, Method I, Case 3

Omitted Items

Assembly	Device	Reason for omission
All	Hardware, shields, straps, overlays, etc.	Stationary mechanical devices with no electrical components.

Summary of Results

1.0 MTBF Predictions

Reliability predictions are presented in the following Table for the SREGS-400U-02 as per MIL-HDBK-217.

Table 1.0
SREGS-400U-02
MTBF & Failure Rate
MIL-HDBK-217, Ground Benign, Controlled, G_B,G_C

Temperature (^{0}C)	MTBF (hours)	MTBF (years)	Failure Rate (FIT*)
25	384,405	43.9	2,601
40	259,396	29.6	3,855

FIT is Failures in 10^9 hours.

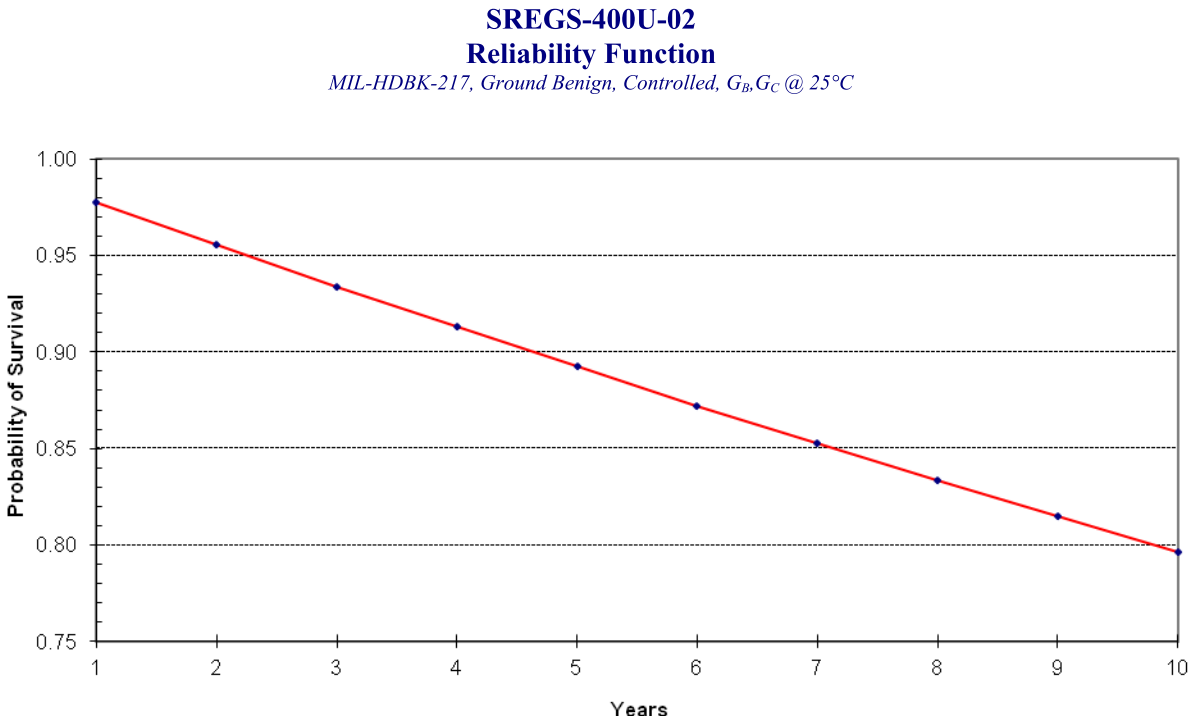
Table 1.1
Sub-assemblies
MTBF & Failure Rate
MIL-HDBK-217, Ground Benign, Controlled, G_B,G_C

Sub-asembly	Temperature (^{0}C)	MTBF (hours)	MTBF (years)	Failure Rate (FIT*)
SREGS-400U-02	25	589,086	67.2	1697.5
SREGS-400U-02	40	382,731	43.7	2612.8
Charging Module	25	2,330,519	266.0	429.1
Charging Module	40	1,867,480	213.2	535.5
HV400 Module	25	2,106,216	240.4	474.8
HV400 Module	40	1,414,777	161.5	706.8

FIT is Failures in 10^9 hours.

1.1 Reliability Function Plot - Probability of Survival

The following plot shows the Probability of Survival, that is the percentage of Failure Free product, as a function of time.



We can expect that 97.7% of product will survive year one, whereas, 79.6% of the product will survive 10 years without failure.

2.0 Margin Analysis

Margin analysis where operating temperature is varied between low and high limits. MTBF and Failure Rate are presented graphically over the range of temperature.

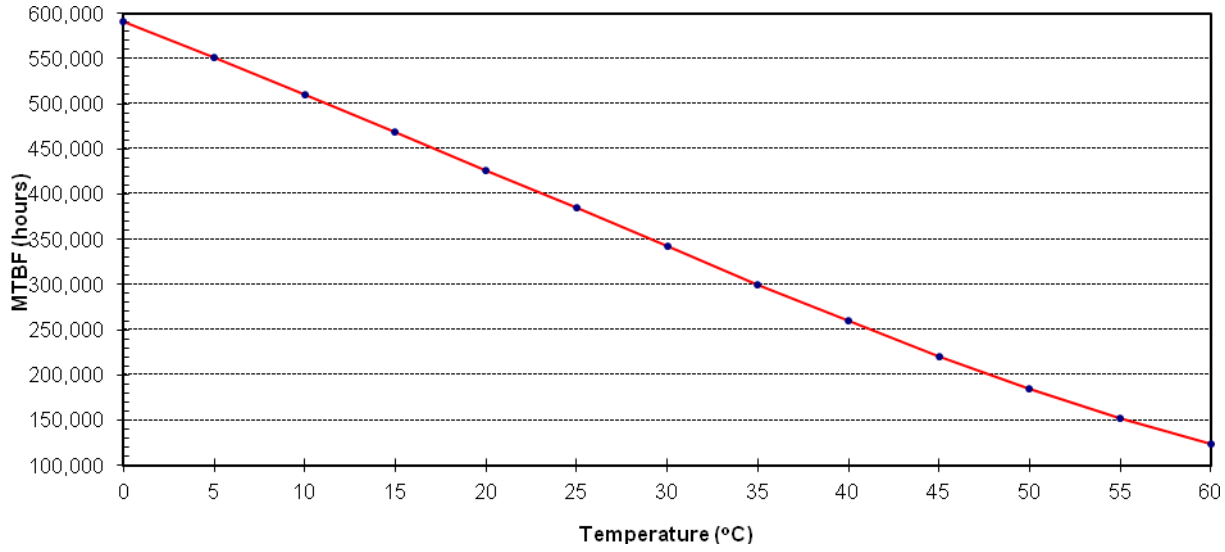
Table 2.0
SREGS-400U-02
MTBF & Failure Rate
MIL-HDBK-217, Ground Benign, Controlled, G_B,G_C

Temperature (^oC)	MTBF (hours)	MTBF (years)	Failure Rate (FIT)
0	591,195	67.5	1,691
5	550,743	62.9	1,816
10	509,889	58.2	1,961
15	468,542	53.5	2,134
20	426,674	48.7	2,344
25	384,405	43.9	2,601
30	342,050	39.0	2,924
35	300,137	34.3	3,332
40	259,396	29.6	3,855
45	220,672	25.2	4,532
50	184,798	21.1	5,411
55	152,459	17.4	6,559
60	124,090	14.2	8,059

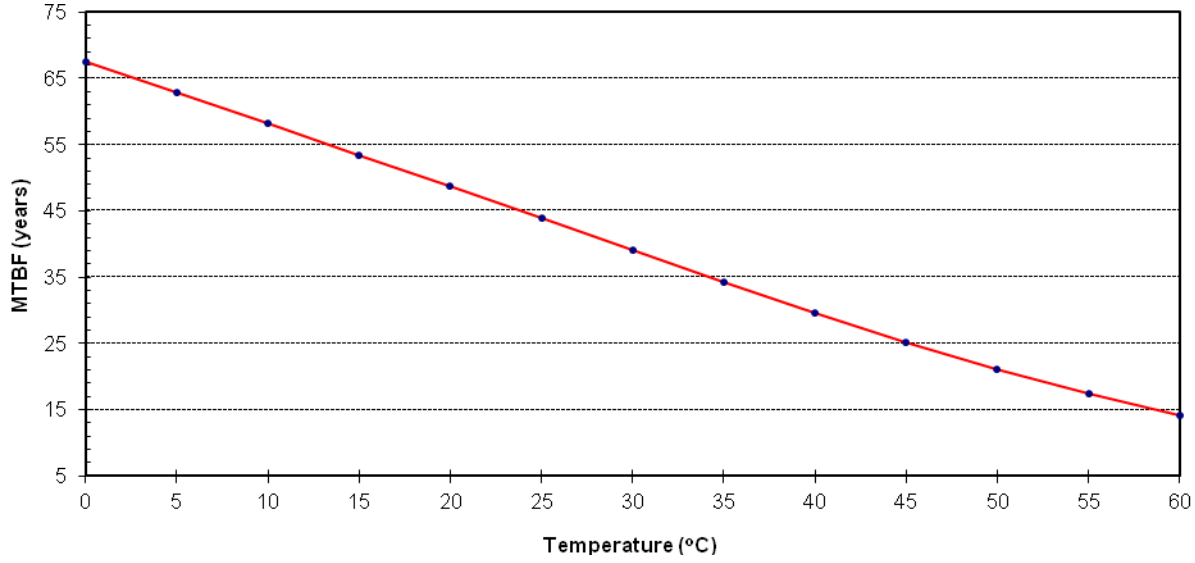
FIT is Failures in 10^9 hours.

2.1 MTBF vs. Temperature

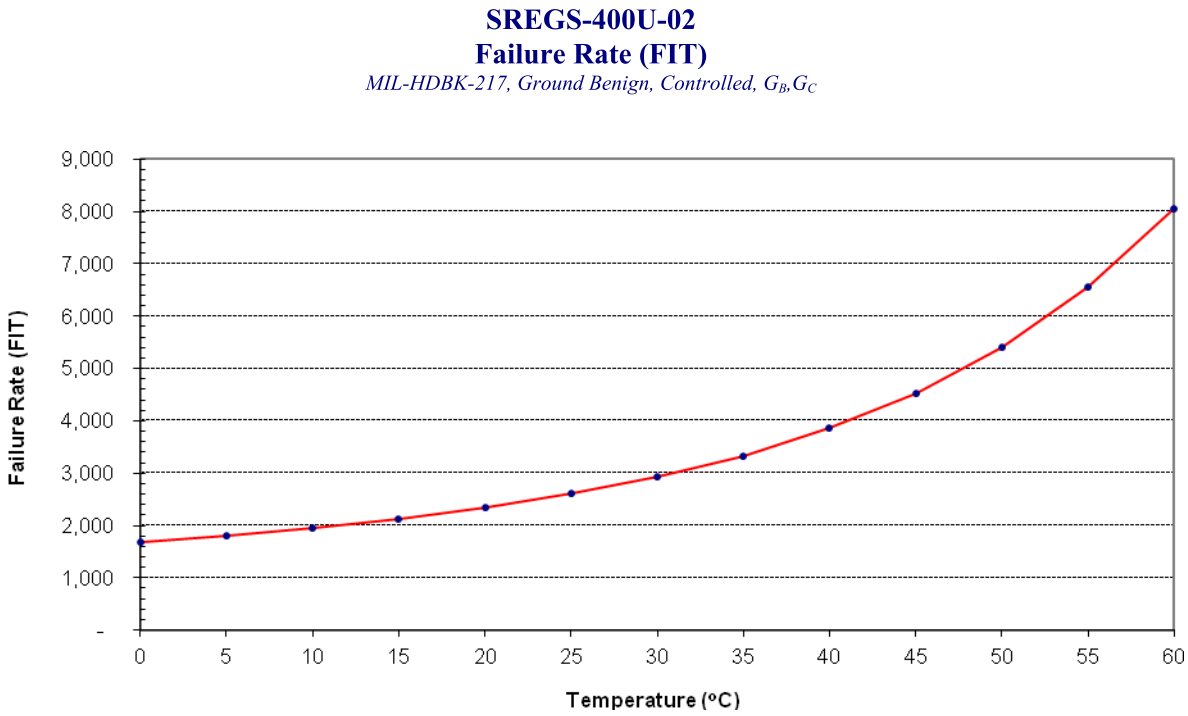
SREGS-400U-02
MTBF (hours)
MIL-HDBK-217, Ground Benign, Controlled, G_B,G_C



SREGS-400U-02
MTBF (years)
MIL-HDBK-217, Ground Benign, Controlled, G_B,G_C



2.2 Failure Rate vs. Temperature



3.0 Revision History

A. Initial release, 2/22/14.