INTRODUCTION (GGE302)

Project Name:

SP10-GGE302 DC DC Synchronous Auto Grade

Objective- To Development Electronics part (DC Supply) for with auto grade components

Scope- DC DC Converter is converter which converter High DC voltage in to Low voltage with below Spec.

Input -35-90V ,Output Rating 12V-10A and 5V 1A DC ,Enclosure- IP 66.

Hardware side - Designing part of his Converter using Synchronous buck converter

Software side- No any scope of work.

Mechanical Side- To develop IP 67 Enclosure in Aluminum casing

Measurement Goals - SV: ±20% , PDD: 0.10±0.02 , PPDD : 0.20±0.02

Link to Project Data : http://192.168.100.9:8080/svn/DC_DC_Converter/SP10_GGE302

Team Size: 10 Nos. Effort Size: 201.04 hrs. Time Line : 07-09-2022 to 31-10-2022

Actual Scheduled Start to planed Finish Date: 19-7-2022 to 01-11-2022

1

Estimating and Planning

High Level Estimation in start meeting with Sr. Management.

- Complexity -Medium Type
- Cost approx 400-450 Rs (assumption with 2 nos Mosfet -160Rs , 2 Inductor 50Rs , 6 nos capacitor -60 ,enclosure-30rs and harness 30rs ,PWM controller-80rs and converter-25Rs)
- Duration-35-40 day (design-7 days, design implementation - 15 days,Testing 10days,validation 5days , other activity-5 days)
- effort- high level reference of GGE295 approx 180-190persone hours

S. No.	Reference Project Name	Why Selected as Reference	Actual Efforts in RD Phase & Planning Phase	Actual Efforts in Design and Implementation	Actual Efforts in Testing and integration	Actual Efforts in Validation Phase , Closure	Actual Efforts in End
1	GGE295 DC-DC Converter 12V-10A & 5V-1A	Capacity Rating is approx equal and input na d output spec. also approx equal.	27	45	27	53	22
		Average Efforts in person hours	**27**	**45**	**27**	**53**	**22**

	Estimated Efforts in RD Phase & Planning Phase	Estimated Efforts in Design and Implementation	Estimated Efforts in Testing and integration	Estimated Efforts in Validation Phase , Closure	Estimated Efforts in End	
Past Projects	27	45	27	53	22	
Differences from reference projects	4	7	4	9	4	Total
Final estimates	31	52	31	62	26	**202**

	Difference from reference in detail	Impact in person hours due to the difference	Complexity	Remarks (Optional)
1	Enclosure Design	-8	H	First time development in Reference Project
2	Auto grade components selection and arrangement	8	H	First time development
3	Synchronous Buck converter Design	10	H	First time development
4	PCB layout and new component footprint making	8	H	First time development
5	5V design	4	M	First time development
6	5V PCB layout	4	M	First time development
7	Testing	10	H	First time testing
8	Readability of Power device and Inductor	-4	M	Reuse components
9	Testing Ids	-4	M	Reuse components
	Total Impact	**28**		

Size	5H+4M+0L

2

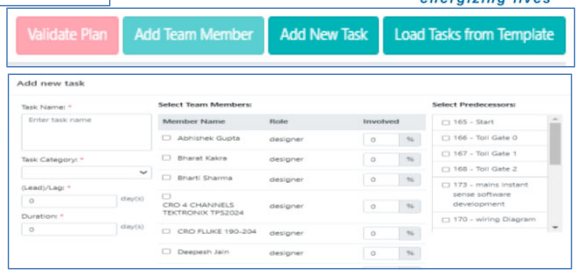
Project Planning in Einframe - Project Plan Link-https://gil.einframe.com/rptprojectoverview.aspx

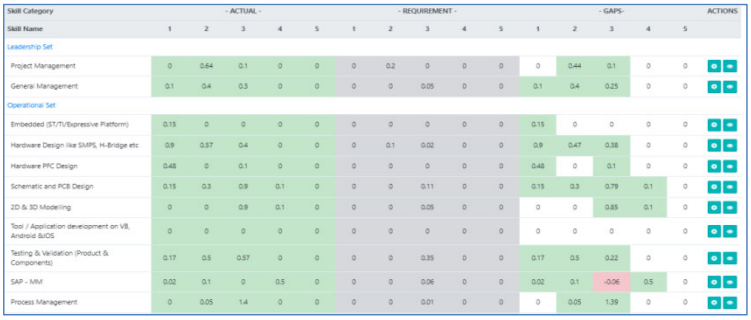
Genus energizing lives

Project Team

Project Manager- SP
Hardware Designer- SP,AK
Mechanical Designer- BK
PCB Designer- RP
Validation Manager- JM
Integrator- RJ
Validator- RS
Material Management- SJ
Reviewer- SJ,SRS,SP,JM
Auditor- SW
Senior Management- TG
Assembler- PK,RK

- Task list making
- Team assign in task with tools (asset and work environment)
- Task approval (Time sheet approval)
- Deployment of plan with team
- Operation and support transition plan
- Team Meeting Planning (6 Times)
- Sr. Management review (8 times)
- Critical dependency (two)
- Audit planning (3 times)
- Review planning at significant task
- CM planning





Skill Category	- ACTUAL -					- REQUIREMENT -					- GAPS-					ACTIONS
Skill Name	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	
Leadership Set																
Project Management	0	0.64	0.1	0	0	0	0.2	0	0	0	0	0.44	0.1	0	0	
General Management	0.1	0.4	0.3	0	0	0	0	0.05	0	0	0.1	0.4	0.25	0	0	
Operational Set																
Embedded (ST/TI/Expressive Platform)	0.15	0	0	0	0	0	0	0	0	0	0.15	0	0	0	0	
Hardware Design like SMPS, H-Bridge etc	0.9	0.57	0.4	0	0	0	0.1	0.02	0	0	0.9	0.47	0.38	0	0	
Hardware PFC Design	0.48	0	0.1	0	0	0	0	0	0	0	0.48	0	0.1	0	0	
Schematic and PCB Design	0.15	0.3	0.9	0.1	0	0	0	0.11	0	0	0.15	0.3	0.79	0.1	0	
2D & 3D Modelling	0	0	0.9	0.1	0	0	0	0.05	0	0	0	0	0.85	0.1	0	
Tool / Application development on VB, Android &IOS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Testing & Validation (Product & Components)	0.17	0.5	0.57	0	0	0	0	0.35	0	0	0.17	0.5	0.22	0	0	
SAP - MM	0.02	0.1	0	0.5	0	0	0	0.06	0	0	0.02	0.1	-0.06	0.5	0	
Process Management	0	0.05	1.4	0	0	0	0	0.01	0	0	0	0.05	1.39	0	0	

Name of Asset	Source	Status
CAD for mechanical design	In-House	Available
MS Office	In-House	Available
Multimeter	In-House	Available
Clamp Meters	In-House	Available
Einframe	In-House	Available
SVN Server	In-House	Available
Altium	In-House	Available
Heat Chamber	In-House	Available
CRO TPS 2024	In-House	Available
Power Analyzer WT 230	In-House	Available
Thermal Imager	In-House	Available
Multi-Sim Hardware Design Software	In-House	Available
CRO Yokogawa DLM 3024	In-House	Available
Vibration tester	Network of Excellence (Vibration Test Setup)	Relationship Exists

3

Genus energizing lives

EXECUTION

Scheduled Start	2022-9-7
Target Finish	2022-10-31
Scheduled Finish	2022-11-1
Priority	Medium
Add to Roadmap	Yes

PROJECT TEAM

Team Member	Role
Sobhag Prajapat	Project Manager
Adarsh Kumar Bairwa	Hardware designer
Bharat Kakra	Mechanical designer

Efforts estimation (Project Size), Meeting for Planning

Sobhag Prajapat [40%] Adarsh Kumar Bairwa [20%] Bharat Kakra [20%] Jalaj Mathur [20%] Rakesh Pandey [20%] Ravi Jindal [20%] Rohit Kumar Sachan [20%] Sandeep Jain [20%] Shweta Aggarwal [20%] Syojiram Sharma [20%]

ASSET REQUIREMENT

Name of Asset	Source	Status
CAD for mechanical design	In-House	Available
MS Office	In-House	Available
Multimeter	In-House	Available
Clamp Meters	In-House	Available
Einframe	In-House	Available

Plan Review with checklist; defects resolve & Close

Sobhag Prajapat [24%] Jalaj Mathur [12%]

Meeting to deploy plan , Plan Approval & Publish

Sobhag Prajapat [20%] Adarsh Kumar Bairwa [6%] Bharat Kakra [6%] Jalaj Mathur [6%] Rakesh Pandey [6%] Ravi Jindal [6%] Rohit Kumar Sachan [6%] Sandeep Jain [6%] Shweta Aggarwal [6%] Syojiram Sharma [6%] Tarun Gupta [6%]

Senior Management Review with Metrics Report , Audit in RD Phase ,Audit NC defect and close

Sobhag Prajapat [70%] Shweta Aggarwal [18%] Tarun Gupta [6%]

Module testing and Support documentation ; defects resolve & Close

ClampMeter Meter [30%] Multimeter Meter [30%] Adarsh Kumar Bairwa [25%] Thermal Imager [15%] CRO 4 CHANNELS TEKTRONIX TPS2024 [10%] Heat Chamber Setup [10%] Sobhag Prajapat [6%] Pawan Kumar Sharma [5%] POWER ANALYZER WT 230 [2%] LCR METER [1%] MICRO OHM METER [1%]

Team Meeting on integration phase

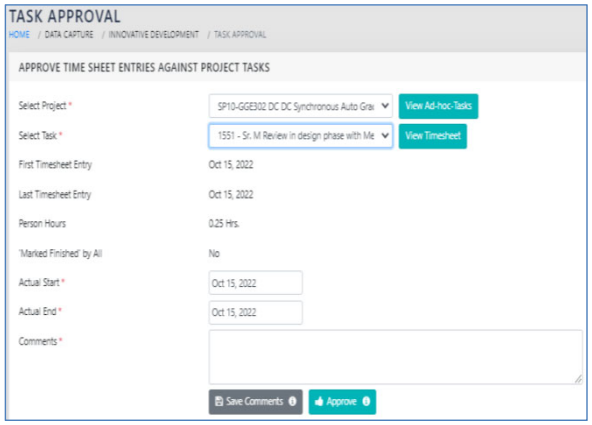
Adarsh Kumar Bairwa [4%] Bharat Kakra [4%] Jalaj Mathur [4%] Rakesh Pandey [4%] Ravi Jindal [4%] Rohit Kumar Sachan [4%] Sandeep Jain [4%] Shweta Aggarwal [4%] Sobhag Prajapat [4%]

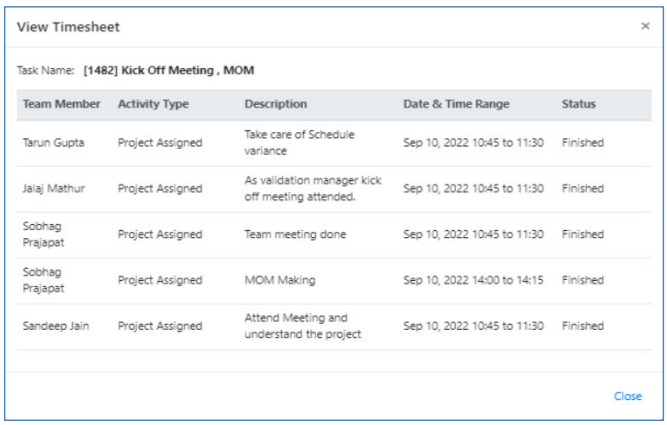
1481	Project Creation and Preliminary Planning up to TG1	Project Management	1480	2022-9-8	0 (days)	1 (days)	2022-9-9
1482	Kick Off Meeting , MOM	Project Management	1476, 1481	2022-9-9	0 (days)	1 (days)	2022-9-10
1483	Requirement Capture & Elicitation	Project Management	1480, 1481	2022-9-9	0 (days)	1 (days)	2022-9-10
1484	Functional Specifications And RTT	Project Management	1482, 1483	2022-9-10	0 (days)	1 (days)	2022-9-12

4

Record task completion

Task ID & Description	Planned Start/End	Actual Start/End	Sch. Variance	Planned Efforts	Actual Efforts	Effort Variance	Planned Cost	Actual Cost	Cost Variance
[1482] Kick Off Meeting , MOM Approved Latest Comments: *Task completed and MOM shared with team* Jalaj Mathur [6%] Sandeep Jain [6%] Shweta Aggarwal [6%] Sobhag Prajapat [6%] Tarun Gupta [6%]	Sep 09, 2022 Sep 10, 2022	Sep 10, 2022 Sep 10, 2022	-100%	2.4	3.25	35%	2.4	3.25	35%

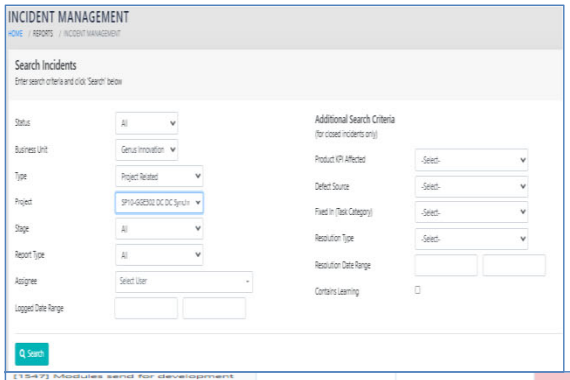




5

- Identify issues and resolution
- Tacking review defect and status.

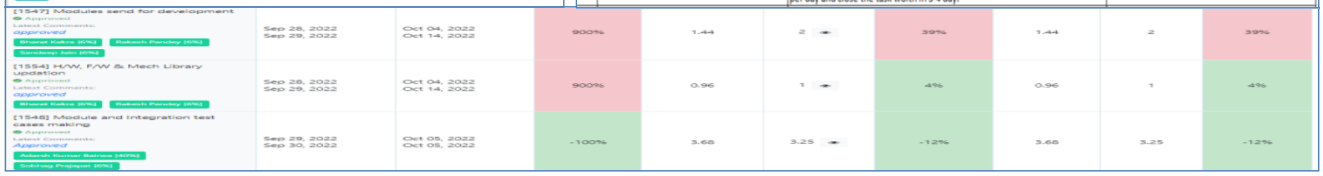
- Managing upcoming task due to delay in last task



6. Minutes of Meeting Details

Name of Meeting	Team Meeting on integration phase
Date and Time	Oct 18, 2022 17:00 to 17:20 (20 min.)
Project's Phase	Integration phase
Participants	Sobhag Prajapat, Adarsh Kumar,Ravi Jindal,Rakesh Panday,Sundeep Jain,Rohit Sachan ,Jalaj Mathur,Bharat Kakra
Absent	Shweta Aggarwal

S.No	Agenda Item	Discussion	Decision/Action item/Issue
1	Pending action items	Not available	
2	Discussion on Delay Task	Design implemetation and review task delay by 15Day	
3	Corrective action for managing project cycle or delay shedule.	Task-[1550] Module testing and Support documentation ; defects resolve & Close - 5 day with 30% per day of AK. we have to manage this work by putting 70-80% effort per day and close the task woith in 2-3 day. Task-[1552] Integration & Testing and Supporting Documentation ; defects resolve & close - 4 day with 50% per day of RJ. we have to manage this work by putting 70-80% effort per day and close the task woith in 1-2 day. Task-[1557] System testing (Validation) and Support Documentation - 5 Day with 50% per day of RS. we have to manage this work by putting 70-80% effort per day and close the task woith in 3-4 day.	We have to take action on PCB and prototype assembly approx 8 nos so below action item is generated . 1. Adarsh identify the required material and request wia google form. 2. Sundeep sir will take necessory action for requested material .

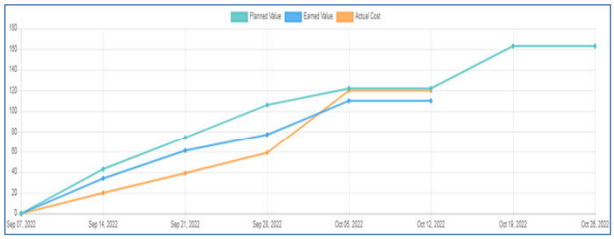


6

EVMS CHART

Causal Analysis,Corrective action,Preventive action

Dates	Sep 07, 2022	Sep 14, 2022	Sep 21, 2022	Sep 28, 2022	Oct 05, 2022	Oct 12, 2022	Oct 19, 2022	Oct 26, 2022
Planned Value	0	43	74	106	122	122	163	163
Earned Value	0	34	61	77	110	110	-	-
Actual Cost	0	20	39	59	120	120	-	-



Weeks	No of Week	Name of Phase	Planned Value	Earned Value	Actual Cost	Schedule variance (EV-PV/PV)*100	Cost Variance (AC-EV/EV)*100
1st	07-09-22 to 14-09-22	RD Phase, Planning Phase	43	34	20	-20.93%	-41.17%
2nd	14-09-22 to 21-09-22	Design and Implementation	74	61	39	-17.56%	-36.06%
3rd	21-09-22 to 28-09-22	Design and Implementation	106	77	59	-27.35%	-23.37%
4th	28-09-22 to 05-10-22	Testing and integration	122	110	120	-9.83%	-9.09%
5th	05-10-22 to 12-10-22	Testing and integration	122	110	120	-9.83%	-9.09%
6th	13-10-22 to 19-10-22	Validation Phase , Closure	163				
7th	20-10-22 to 26-10-22	Validation Phase , Closure	163				
8th	27-10-22 to 01-11-22	Validation Phase , Closure	201.2				

<GGE302> METRICS REPORT

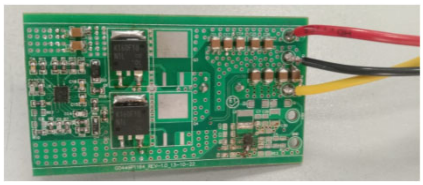
Contents

7

Project is Running in Module testing

GGE302_HWTCAS

Test Case ID	Test Case Description	Sub-Module Name	Tools Required	Testing Steps	Expected Result	Actual Result	PCB Number	Pass/Fail
HWD_1.1_A	UVLO and Start Up Test	NA	Multimeter, Power Supply	1. Power supply DC supply connected to modules 2.increses voltage from 0 to 48 Volt 3.check output voltage ,measure low cut recovery and low cut voltage at no load and at 10A resistive load (1.2 OHM)	Low cut recovery voltage -30V+/-5V Low cut voltage -20 v+/- 5V			
HWD_1.1_B	Voltage Regulation Test	NA	Multimeter, Power Supply,CRO,	1. Step change from 0 % load to 100% load at 40V input capture the O/P Voltage wave form and measure undershoot . 2.Step change from 100% load to 0% load at 40V input, capture the o/p voltage waveform and measure overshoot. 3. Step change form 40 V to 90V at 100% load ,capture the o/p voltage waveform and measure overshoot. 4. Step change form 90V to 40V at 100% load ,capture the o/p voltage waveform and measure overshoot.	voltage ragulation = +/-5%			



GGE302_MCTCAS

Test Case ID	Test Case Description	Part Name	Tools Required	Testing Steps	Expected Result	Actual Result	Drawing Number	Pass/Fail	Remarks
MCHT_1	Measure Outer size and all bendings of aluminium part	BODY	Varnier caliper, Tape,Scale	Measurement as per drawing.	85X50X33MM				
MCHT_2	Measure position and hole dia. for mosfet support clip	Body	Varnier caliper, scale	Match the dimensions c to c Check fitment	As per drawing				

GGE302_INTCAS

Test Case ID	Test Case Description	Inputs	Tools Required	Testing Steps	Expected Result	Actual Result	Pass/Fail	Remarks
INT_1	Integrated side cover and grove-met	Side Plate HW_2896 Rubber grove-met	By Hand	Rubber grove-met push into the side cover hole by fingers	Rubbergrovemet must properly fixed			
INT_2	Integrated cover, grove met , Harness HW_2857 and Harness HW_2858	Step 1 outcome Harness HW_2857 Harness HW_2858	By Hand	Insert the each wire into the rubber grove met up to sleeve	Wire insertion shoud properly .			

8