



Eight Discipline Report (8D Report)

To:	8D report No.:
From: : Chicony Power Technology	RMA claim No.: N/A
CC :	Chicony Power P/N: A180AP01Q-FW01
	Customer P/N: PK37A019500
Submit date: 2023/9/21	Product description: 180W PD
Receive date: 2023/9/5	Defect D/C or Lot No.:
Subject : 客戶反饋 DVT1 樣機搭配系統系統測試時, PSU 無輸出	

D1.) 問題解決成員:Use Team Approach

主持者 (Team Leader) :

內部成員 (Internal Team Members):

外部成員 (External Team Member):

D2.)問題說明:Problem Description:

(Note: Use **who, what, when, where, why, how, how many** to specify the Customer's problem.)

CPT received feedback from customer on Sep 5th that 1pcs DVT1 adapter was found damage when used with system

The Sample serial number: <https://fr.mw/FRANCNCH713121006B>.

Check the sample appearance and find no abnormality.



D3.)內部或客戶的暫時解決辦法及實施日期:Implement and Verify Containment Action:

(Note: Internal / external containment action effectiveness and date.)

1. CPT got this PSU from customer for further analysis.

2. CPT send 1pc PSU to customer for exchange.

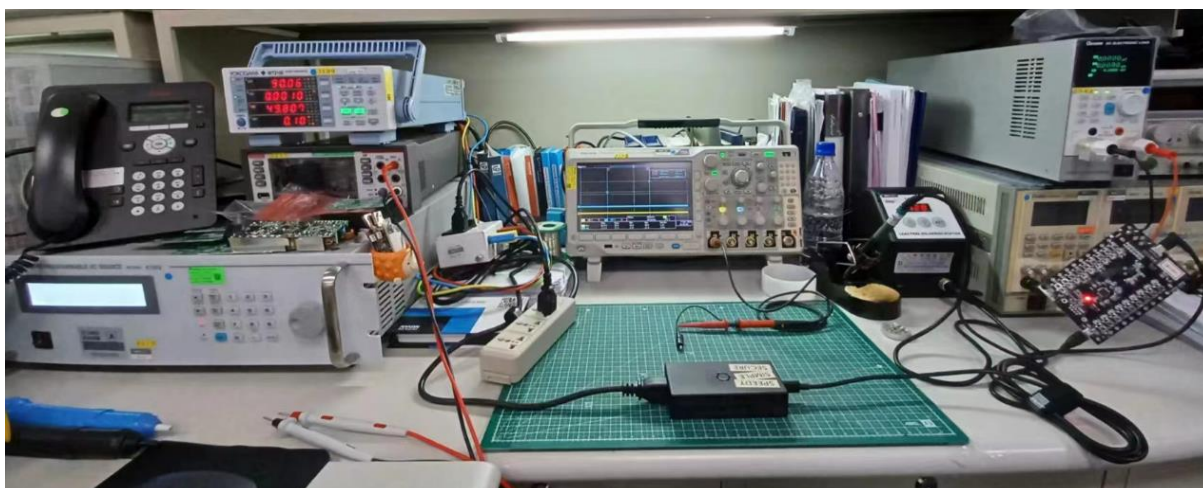
Date:2023/9/6

D4.)不良原因確認: Define and Verify Root Causes:

(Note: Identify and verify all suspect causes, which needs explain why the problem occurred.)

1. Failure Analysis:

Check the sample function and find no output when AC source is on.



2. Check the RTV glue and find no abnormality when the case is opened.



(Top side)

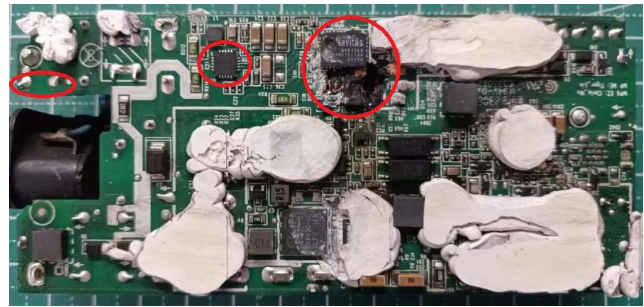


(Bottom side)

3. After the shielding is removed, and removed RTV glue. S1, S3 are found damaged upon visual inspection and F1, U1 also damaged through measurement.



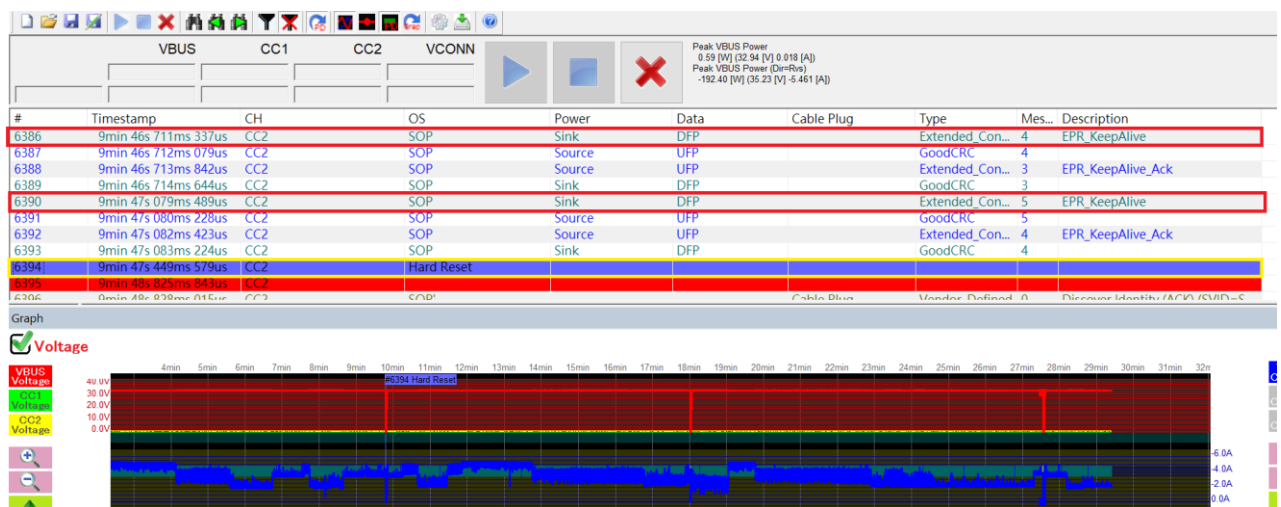
(Before the removal of RTV glue)



(After the removal of RTV glue)

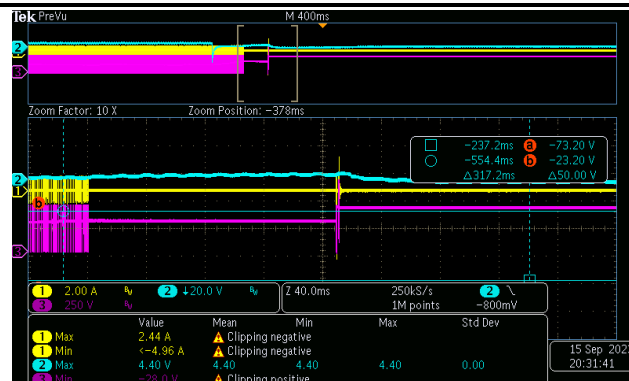
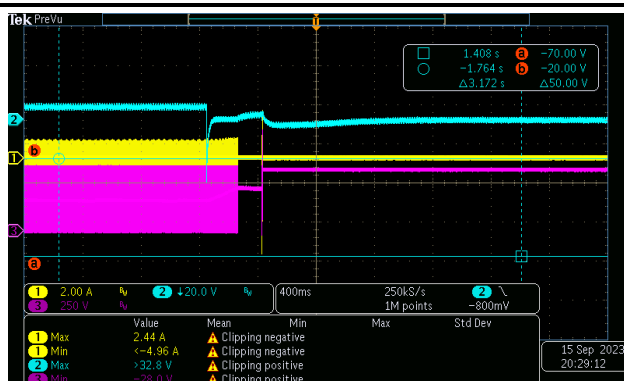
4. Root Cause Analysis of The Issue

- When the adapter works with the system for charging with output voltage of 36V, the “Hard Reset” issue was recorded for 3 times during the 4%~40% battery power.
- Such “Hard Reset” issue will lead to the output voltage drop from 36V to 0V and make the PD IC on the Adapter side turn off the Blocking MOSFET, so it is equivalent to DC cable unplug.



- After the Adapter is unplugged DC Cable or “Hard Reset” at 36V output, the Q61 (Blocking MOS) Vgs is measured as -32.8V, which exceeds the component spec of +/-20V.

After the Blocking MOS is turned off for about 400ms, it is turned on again and causing the withstand voltage of S1 & S3 (AHB GaNFET) exceeds the spec, so the PSU damages



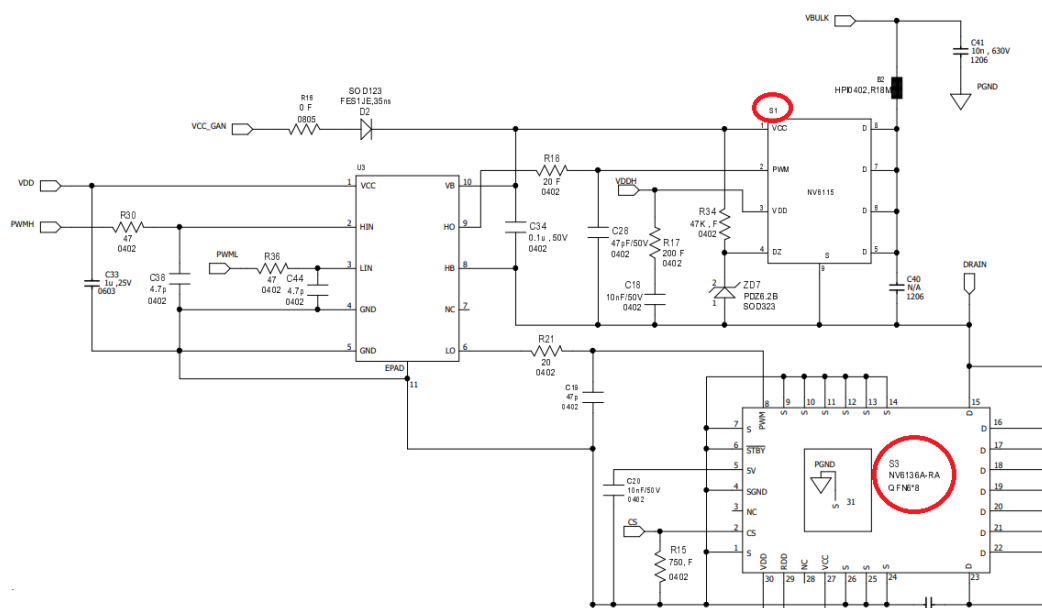
6.1. Absolute Maximum Ratings⁽¹⁾

(with respect to Source (pad) unless noted)

SYMBOL	PARAMETER	MAX	UNITS
V_{DS}	Drain-to-Source Voltage	-7 to +650	V

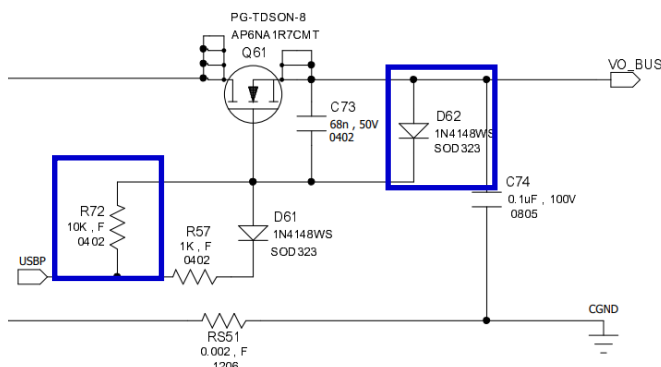
6. Root Cause Analysis of The Issue

- S1 is high side GaNFET & S3 is low side GaNFET



7. Corrective action

- The 180W PD is designed with maximum output voltage spec of 36V. When the output voltage drops from 36V to 0V, there is a instantaneous reverse voltage spike, which should be solved by use of a diode and a smaller Rg resistor, so as to allow for rapid discharge of Q61 Vgs.



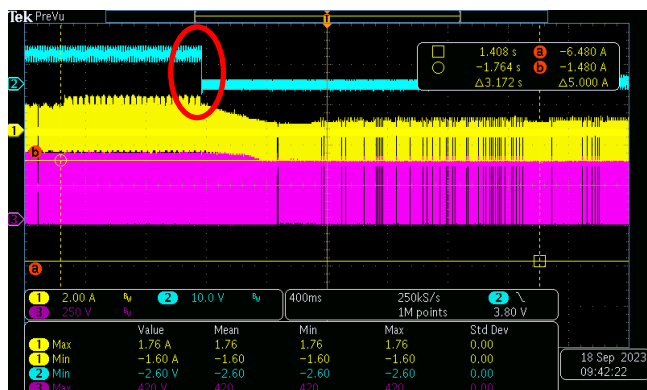
Component Change:

1.R73=1M-->D62=1N4148WS

2.R72=30K-->10K

8. Verification

With the introduction of corrective action, after the adapter is turned on to 36V output and the DC cable is unplugged, the Q61 (Blocking MOS) Vgs is measured as -2.6V, which meets the component spec of +/-20V.



Conclusion:

1. Framework informed that 1pcs DVT1 adapter was found damage when used with system.
2. After the bottom side is removed with RTV, AHB GaNFETs (S1, S3) are found damaged upon visual inspection and F1, U1 also damaged through measurement.
3. Root Cause Analysis: When the adapter works with the system for charging with output voltage of 36V, the Hard Reset issue was recorded for 3 times during the 4%~40% battery power.
4. Such "Hard Reset" issue will lead to the output voltage drop from 36V to 0V and

make the PD IC on the Adapter side turn off the Blocking MOSFET, so it is equivalent to DC cable unplug, during which the Q61 (Blocking MOS) Vgs is measured as -32.8V and exceeds the component spec of +/-20V.

5. After the Blocking MOS is turned off for about 400ms, it is turned on again and causing the withstand voltage of S1 & S3 (AHB GaNFET) exceeds the spec, so the PSU damages.
6. Corrective action: When the output voltage drops from 36V to 0V, there is a instantaneous reverse voltage spike, which should be solved by use of a diode and a smaller Rg resistor, so as to allow for rapid discharge of Q61 Vgs.
7. Such solution corrective action was introduced to DVT2 build

Action Items 1:

Components Stress Analysis Report of R72 , Result: PASS

Model : FRANCNC00 Rev: X1 BOM Revision : X01
UP/N : A180AP01Q Ambient Temperature : 40°C
Test Conditions : Input Voltage Range 1 : 90Vac 264Vac
Output Load : Max Load (+36V/5A)

Resistors

Location	Component Description	Component Specifications				Stress In Application			Calculated Stress Factors			Stress Ratio Spec.			Stress
		Resistance(Ω)	Power(W)	Vrms(V)	Max.(°C)	Vrms(V)	Power(W)	Tc(°C)	Vrms Ratio	Power Ratio	Temp. Ratio	Vrms	Power	Temp.	OK?
90Vac	R72	10000	0.0625	50	155	0.389	0.00	92.4	0.01	0.00	0.60	0.90	0.37	0.90	YES
264Vac	R72	10000	0.0625	50	155	0.383	0.00	76.3	0.01	0.00	0.49	0.90	0.46	0.90	YES

Action Items 2:

Differentiation of DVT1 and DVT2 Samples

- DVT1 sample laser drawing: Rev: X1, Shows DVT Sample in the top right corner.



DVT2 sample laser drawing: Rev: X2, Shows DVT2 Sample in the top right corner.

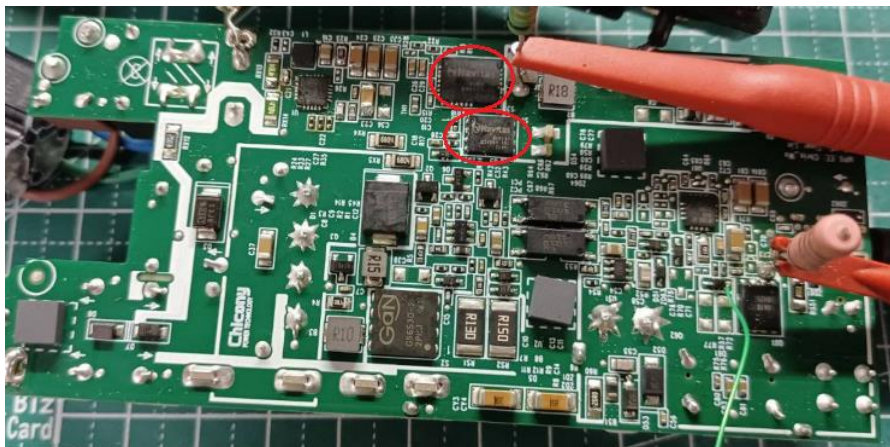


Action Items 3:

For DVT1 sample DC cable unplug find no output when AC source is on. After the bottom side is removed with RTV find no abnormality , but S1,S3 damaged through measurement.

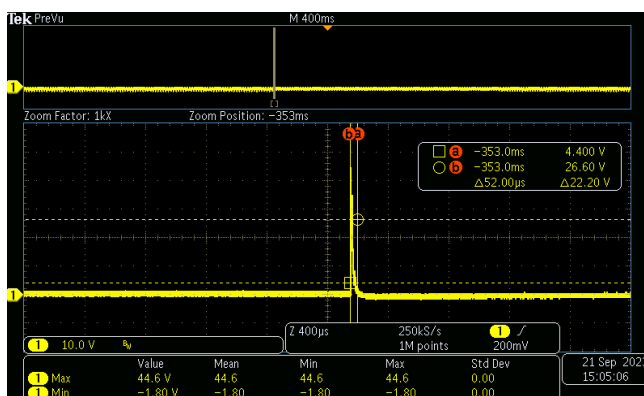
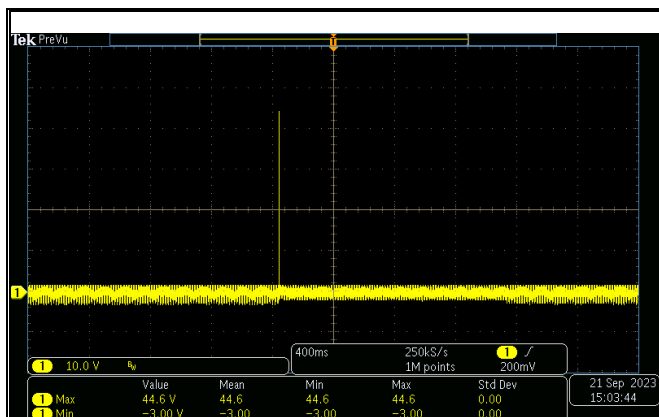


For DVT2 sample DC cable unplug find no output when AC source is on. After the bottom side find no abnormality, but S1,S3 damaged through measurement.



Action Items 4:

For DC Cable unplug USBP to discharge the VO_BUS,
pull down resistor 1Kohm of this pin pluse voltage is 44.6V, calculate maximum current is 44.6mA ,WT6676F
Pin12 GPIO2/GATE <50mA



D5.)改善措施:Corrective Action Verification:

(Note: Be make sure the corrective actions is effective in process as well as able to fix the customer complaint problem)

1. Modification: R73 1M-->D62=1N4148WS, R72=30K-->10K

2. This solution require importing after DVT1

Date:2023/09/21

D6.)改善措施實施日期:Implement Permanent Corrective Actions:

(Note: Be provide the phase-in date or lot# of corrective actions **implementation** in process)

immediately

D7.)預防再發生措施:Prevent Recurrence:

(Note: Modified the management, operating systems, practices, and procedures to prevent recurrence for the problems as well as lessons learned cases.)

Same as D5

D8.)確認並感謝問題解決成員:Check and Congratulate the Team:

(Note: Recognize the collective efforts of the team.)

Thanks to you all ! ! !

Sales: Gordon Wang RD: Chris Wu

Signature	Cf_Liu
Team Leader:	
	Name – Title
Signature by Approver:	Wade_Lo
	Name-Title