Eight Discipline Report (8D Report)

To:	**8D report No.: CPK0409**
From: Chicony Power Technology	**RMA claim No.: N/A**
CC:	**CPT P/N: W030R019Q-GS01-0A**
	Customer P/N: GC867
Submit date:2021/06/10	**Product description: 30W Adapter**
Receive date:2021/06/09	**Defect D/C or Lot No.: N/A**

Subject： Adapter Fuse open Issue *1pc

Keywords/關鍵字：MOSFET、Fuse

D1.) 問題解決成員:Use Team Approach

主持者 (Team Leader)：**Tony_Xsu**

內部成員 (Internal Team Members):

CQS : Maria_chen/Miya_Lu

MFG: Fang_Liu/Wei_Li

QE: Nono_Chen

OOBA: Yanhua_Shao

SQE: Wendy_Wen/Yanhua_Hu

外部成員 (External Team Member): **N/A**

D2.)問題說明:Problem Description:

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

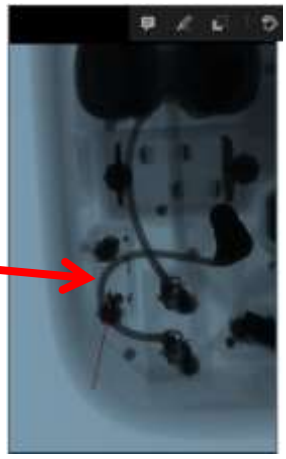
2021/06/09 ： The adapter caused some damage to the extension cable, and the adapter doesn't show any exterior damage, the fuse is also blown. Some pictures are also attached for your reference.

P/N: W030R019Q-GC01

S/N: GC867

Symptom: Fuse Open

Fuse Open



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.**)**

Replace the defect unit. And send the defect unit to do analysis.

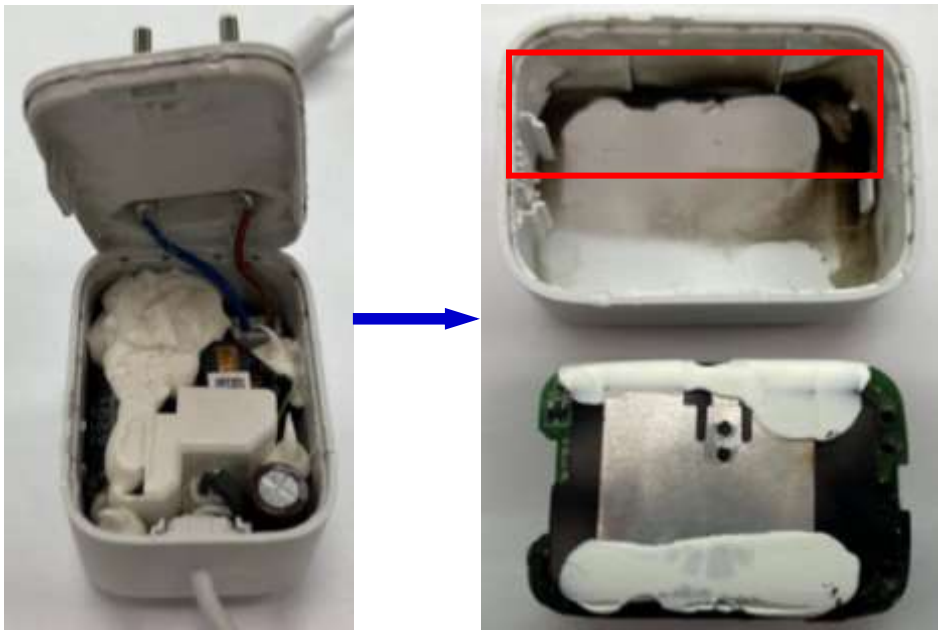
Target date: 2021/6/10

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.**)**

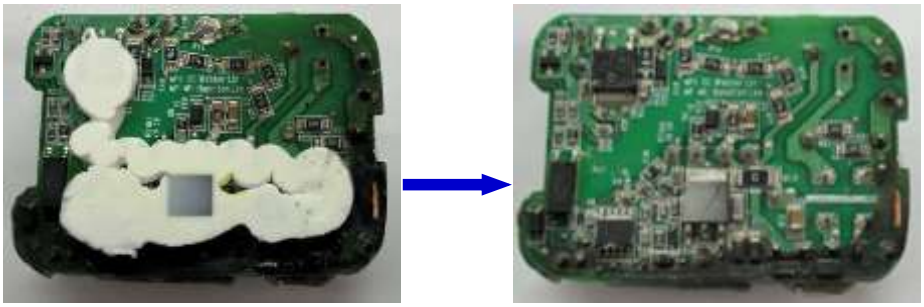
1. Check the defective products returned by the customer and find no abnormality in appearance.

2. Remove the movement and there are blackened marks in the shell.。



3. Remove the protective cover, SMD black marks below the surface.

4. Remove the heat dissipating white glue and check the damaged parts.



5. The damaged parts are as follows :

(1) **Fuse (F1) ➔ Open。**

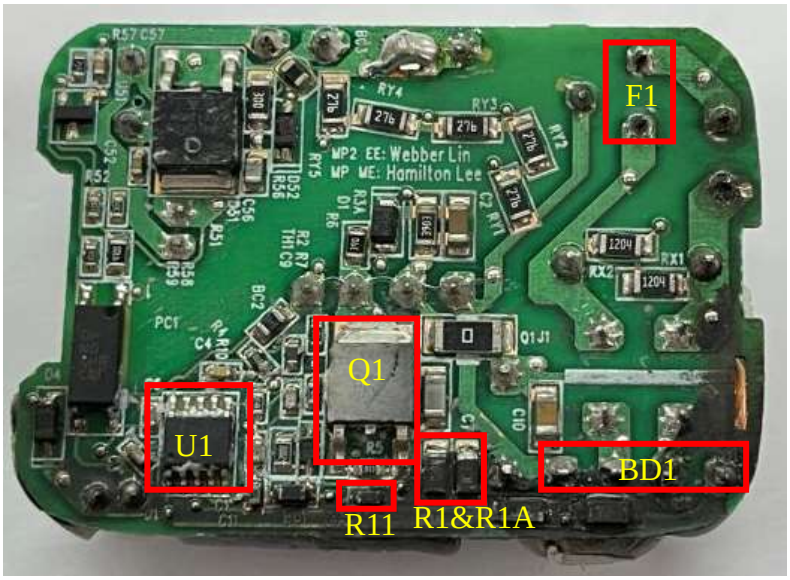
(2) **Bridge Diode (BD1) ➔Short。**

(3) **MOSFET (Q1) ➔Short (D - S)。**

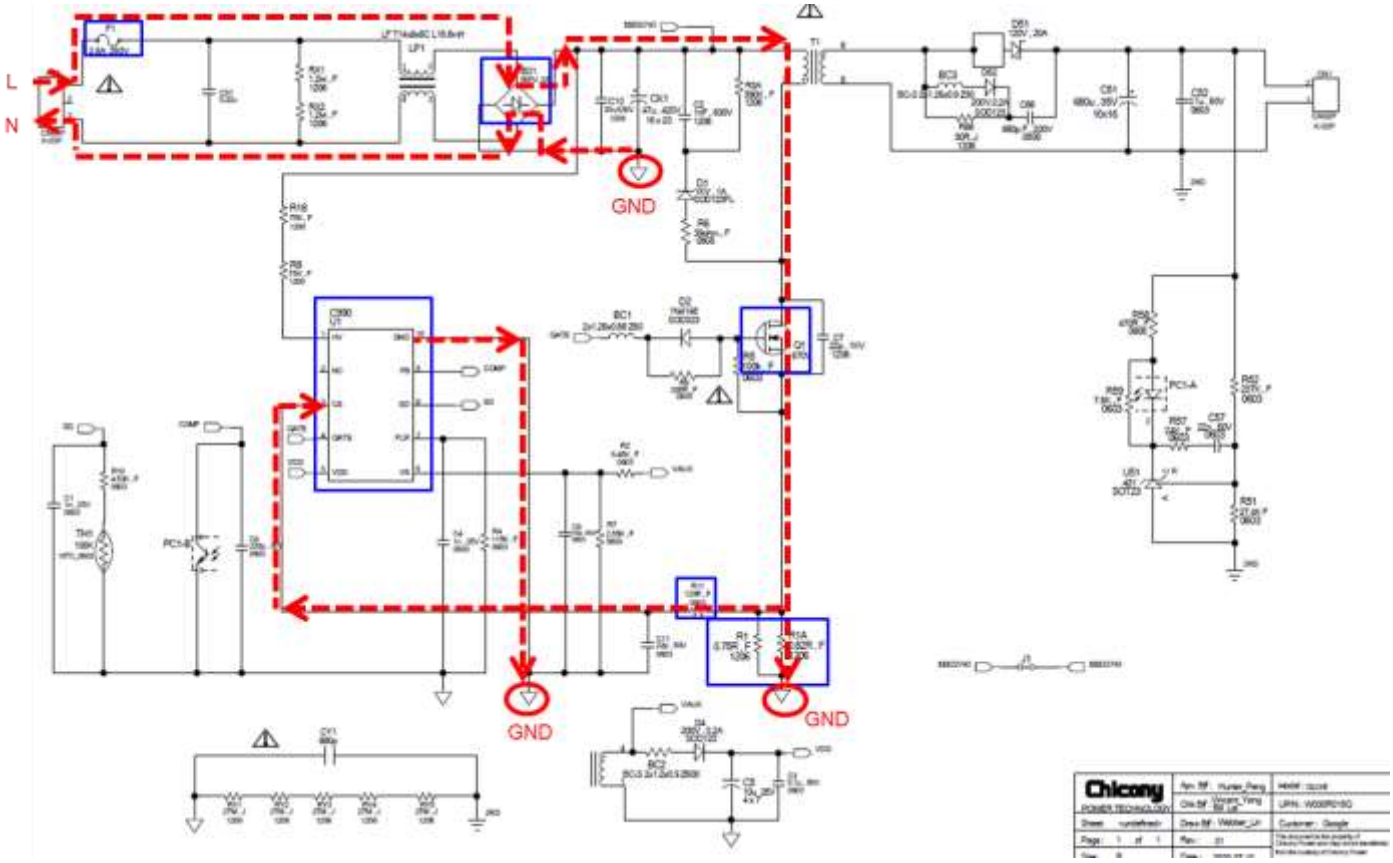
(4) **Current sense resistance (R1&R1A) ➔Open。**

(5) **PWM IC (U1) ➔ Short。**

(6) **PWM IC CS PIN RC filter resistance (R11) ➔ Open。**



6. The damage path is shown below :



7. Provide major defective parts to supplier to analyze the cause of damage

Bridge Diode (BD1)

41003030200120HF BRIDGE-DIP 800V 2A GBP TUBE

Yang Jie[揚杰] GBP208A

MOSFET (Q1) :

5MS063650800Y3HF NMOS SMD 670V 8A 1ohm 150C TO252 T/R

RESOURCES HUAJING CS8N65 A4R-G

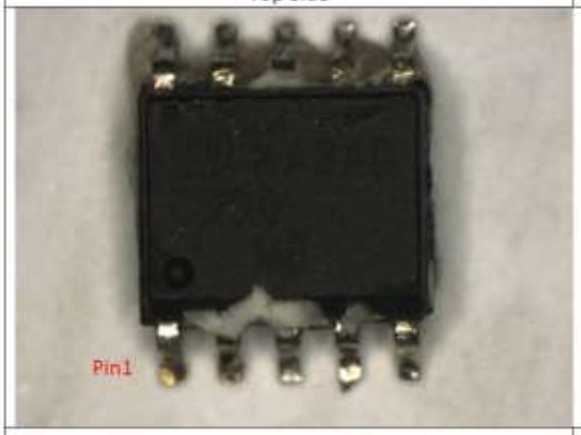
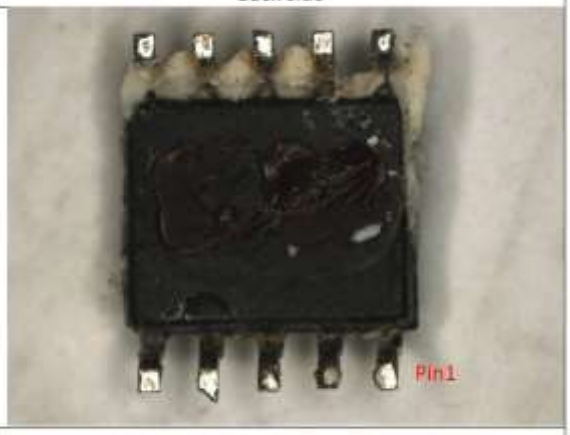
PWM IC (U1) :

601059011701KHHF IC-SMD QR PWM CNTL SOIC10 T/R

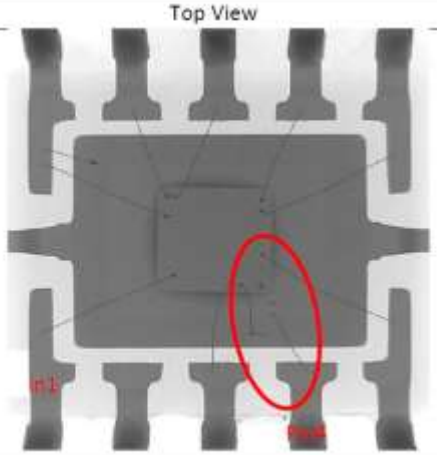
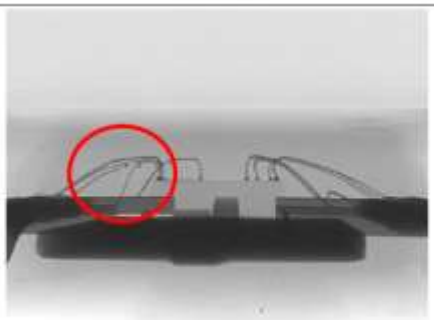
ON C990

8. U1 vendor analysis:

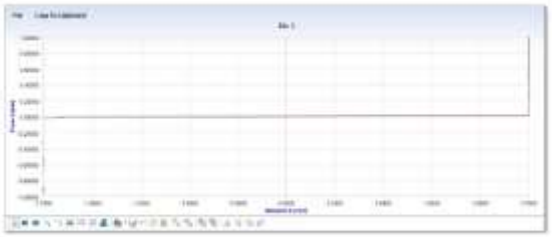
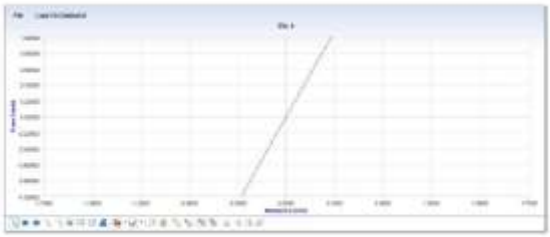
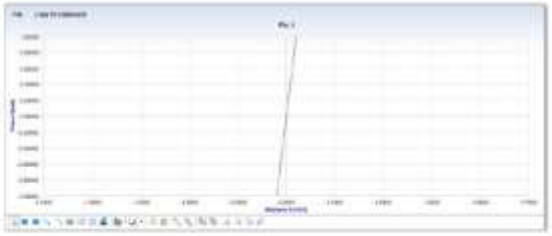
Package External Visual Inspection (S/S:1ea): No anomaly in the package external visual inspection.

Top Side	Back side
	
Top side optical image revealed no anomaly.	Bottom package optical image revealed no anomaly.

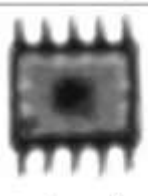
- **X-ray Inspection (S/S:1ea): Wire burn out.**

Top View	Side View
	
Top view wire burn out.	Side view wire burn out.

- **Curve Trace (S/S:1ea): Curve trace images of the EFAR unit revealed open/short failure.**

	
Curve trace image showed Pin3 open	Curve trace image showed Pin4 short.
	
Curve trace image showed Pin5 short.	

- **SAT Analysis (S/S:1ea): Detected was delamination on die surface, top side lead and pad.**

		
C-sam image showed delamination on die surface, top side lead and pad.	C-sam image showed no delamination on back-side pad.	T-sam image showed delamination.

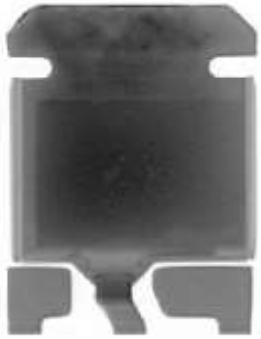
- **In conclusion by ON SEMI:**

investigative results indicate that the cause of failure for this single returned unit is not linked to a systemic manufacturing-related failure mechanism. Instead, data collected during analysis of the returned unit suggests that electrical damage, due to an Electrical Overstress (EOS) event, is the most likely cause of failure.

9. Q1 vendor analysis:

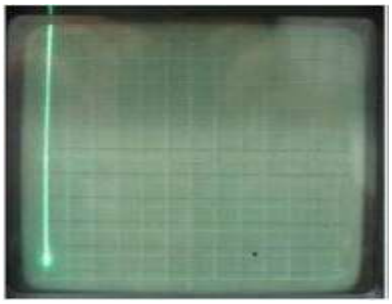
- **X-Ray Inspection**

Use X-RAY to inspect the samples, inspection shows sample assembly quality no obvious abnormal. Picture as below:



- **Parameter testing**

Using QT-2 transistor tester to test the electrical parameters of the sample, G-S and D-S have short-circuited, V-I characteristic curve as below:



- **D-CAP and OM inspection**

D-cap failure sample and OM inspection, it was found that there is obvious burn mark in source region on chip surface. Picture as below:

- **Analysis Conclusion by Huajing：**

According to the outlook of the sample, the detection of X-Ray, the test of the parameters, and the failure mode of the chip, we analyzed and concluded that sample failure is caused by EOS. Machine were aging tested and inspected in the chicony power and meet standard. It means machine and components in circuit is no abnormal. Now product is failure in end-customer market, the max. probability of MOSFET EOS is machine suffering some accidental factors in the market using. Above conclusion is from failure MOSFET, for you reference

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**)**

Waiting for vendor analysis.

1. **Continue to go further study with U1 vendor ON SEMI.**

   Please find the analysis report by ON SEMI

8D Report

Customer Information		ON Semiconductor Information	
Name	WORLD PEACE INDUSTRIAL CO.,LTD	Customer Quality Champion	Darren Liao
Contact	Webber Lin	Phone	+886-2-7710-5231
Phone		Email	Darren.Liao@onsemi.com
Email	Webber_Lin@chiconypower.com	EFAR #	526811
Reference #	Chicony Power Technology Co.,LTD.	ON Semiconductor Part Number	C990
Customer Part Number		Sample Receive Date	28 JUN 2021
Initiate Date	20 Jun 2021	Qty. Received	1
Point of Failure	END CUSTOMER (AE)	Package Type	SOIC-10_751EE_REEL_2500

Detailed Unit Information

Unit #	Markings	Date Code	Assy Site	Assy Lot	Test Site	Test Lot	Wafer Fab	Wafer Lot
1	KA3A0 C990 MB	2007	TAD	D2K080067	TAD	D2K080067	UWB	

2. Continue to go further study with Q1 vendor: Huajing

Please find the analysis report by Huajing

Effective date: 2021/8/10

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**)**

Waiting for vendor analysis

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**.)**

Waiting for vendor analysis

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！！！

Signature

Team Leader: **Maria_Chen**

Name – Title

Signature by Approver: **Tony_Hsu**

Name-Title