# Eight Discipline Report (8D Report)

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|---|---|
| To： | 8D report No.： |
| From：**Chicony Power Technology** | RMA claim No.： **N/A** |
| CC： | Chicony Power P/N：**W065RP76P-AX01** |
| | Customer P/N：**0A001-01056600** |
| Submit date: | Product description：**65W PD** |
| Receive date：**2023/9/5** | Defect D/C or Lot No.： |
| Subject：**客戶告知 X01 版本單體，搭配手機測試，PPS 功能異常，無法維持 19.58V 充電。** **FW(韌體)** | |

**D1**.) 問題解決成員:Use Team Approach

主持者 (Team Leader)：**Edward Ho**

內部成員 (Internal Team Members)：

**PM：Laura Fang**

**Sales：Jennie Chiang**

**RD：Will Wu**

外部成員 (External Team Member)：

**Richtek：Macro Chang、Yiwei Wu、Ben Chi、Patty Wu**

**D2**.)問題說明:Problem Description:

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

**客戶告知 X01 版本單體，搭配手機測試，PPS 功能異常，輸出電壓會下降且無法維持 19.58V 充電。**

**樣機單體：W065RP76P-AX01 / Version X01。**

**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.**)**

**2023/9/7 從客戶端拿到了樣機並分析。**

**2023/9/8 提供客戶分析報告與解決方案。**

**2023/9/9 PD IC FW 依解決方案改版。**

**2023/9/11 提供客戶樣機單體做測試。**

**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. **樣機單體使用電子負載 Chroma 63640 與 PD 治具，在 PPS 模式下可正常運作。**
2. **樣機單體以手機系統作為輸出負載，Request PPS 19.58V/1.1A (index 211) 後，就 Request PPS 9V/2A (index 217)；無法維持 PPS 19.58V 充電。**

| | SOP | Msg | ID | Direction | Obj | Rev | Elapsed | VBUS/IBUS | Data | Note |
|---|---|---|---|---|---|---|---|---|---|---|
| 208 | SOP | GoodCRC | 1 | SRC←SNK | | V2 | 0:01:15.430 | 15.608V/1.094A | 41 02 | |
| 209 | SOP | PS RDY | 2 | SRC→SNK | | V3 | 0:01:15.450 | 15.608V/1.094A | A6 05 | |
| 210 | SOP | GoodCRC | 2 | SRC←SNK | | V2 | 0:01:15.450 | 15.640V/1.088A | 41 04 | |
| 211 | SOP | Request | 2 | SRC←SNK | 1 | V3 | 0:01:15.625 | 15.640V/1.088A | 82 14 16 A6 07 53 | Pos:5 PPS:19.58V,1.1A |
| 212 | SOP | GoodCRC | 2 | SRC→SNK | | V3 | 0:01:15.626 | 17.100V/3.128A | A1 05 | |
| 213 | SOP | Accept | 3 | SRC→SNK | | V3 | 0:01:15.628 | 17.100V/3.128A | A3 07 | |
| 214 | SOP | GoodCRC | 3 | SRC←SNK | | V2 | 0:01:15.628 | 17.100V/3.128A | 41 06 | |
| 215 | SOP | PS RDY | 4 | SRC→SNK | | V3 | 0:01:15.884 | 17.100V/3.128A | A6 09 | |
| 216 | SOP | GoodCRC | 4 | SRC←SNK | | V2 | 0:01:15.885 | 19.568V/0.086A | 41 08 | |
| 217 | SOP | Request | 3 | SRC←SNK | 1 | V3 | 0:01:15.913 | 19.568V/0.086A | 82 16 28 84 03 53 | Pos:5 PPS:9V,2A |
| 218 | SOP | GoodCRC | 3 | SRC→SNK | | V3 | 0:01:15.914 | 16.301V/0.084A | A1 07 | |
| 219 | SOP | Accept | 5 | SRC→SNK | | V3 | 0:01:15.916 | 16.301V/0.084A | A3 0B | |

3. **電壓由 16.08V 昇至 19.58V 時，發生輸出電流變大至 3.1A 。**

| | SOP | Msg | ID | Direction | Obj | Rev | Elapsed | VBUS/IBUS | Data | Note |
|---|---|---|---|---|---|---|---|---|---|---|
| 204 | SOP | GoodCRC | 0 | SRC←SNK | | V2 | 0:01:15.034 | 15.665V/1.090A | 41 00 | |
| 205 | SOP | Request | 1 | SRC←SNK | 1 | V3 | 0:01:15.427 | 15.665V/1.090A | 82 12 16 48 06 53 | Pos:5 PPS:16.08V,1.1A |
| 206 | SOP | GoodCRC | 1 | SRC→SNK | | V3 | 0:01:15.428 | 15.608V/1.094A | A1 03 | |
| 207 | SOP | Accept | 1 | SRC→SNK | | V3 | 0:01:15.430 | 15.608V/1.094A | A3 03 | |
| 208 | SOP | GoodCRC | 1 | SRC←SNK | | V2 | 0:01:15.430 | 15.608V/1.094A | 41 02 | |
| 209 | SOP | PS RDY | 2 | SRC→SNK | | V3 | 0:01:15.450 | 15.608V/1.094A | A6 05 | |
| 210 | SOP | GoodCRC | 2 | SRC←SNK | | V2 | 0:01:15.450 | 15.640V/1.088A | 41 04 | |
| 211 | SOP | Request | 2 | SRC←SNK | 1 | V3 | 0:01:15.625 | 15.640V/1.088A | 82 14 16 A6 07 53 | Pos:5 PPS:19.58V,1.1A |
| 212 | SOP | GoodCRC | 2 | SRC→SNK | | V3 | 0:01:15.626 | 17.100V/3.128A | A1 05 | |
| 213 | SOP | Accept | 3 | SRC→SNK | | V3 | 0:01:15.628 | 17.100V/3.128A | A3 07 | |
| 214 | SOP | GoodCRC | 3 | SRC←SNK | | V2 | 0:01:15.628 | 17.100V/3.128A | 41 06 | |
| 215 | SOP | PS RDY | 4 | SRC→SNK | | V3 | 0:01:15.884 | 17.100V/3.128A | A6 09 | |
| 216 | SOP | GoodCRC | 4 | SRC←SNK | | V2 | 0:01:15.885 | 19.568V/0.086A | 41 08 | |
| 217 | SOP | Request | 3 | SRC←SNK | 1 | V3 | 0:01:15.913 | 19.568V/0.086A | 82 16 28 84 03 53 | Pos:5 PPS:9V,2A |
| 218 | SOP | GoodCRC | 3 | SRC→SNK | | V3 | 0:01:15.914 | 16.301V/0.084A | A1 07 | |
| 219 | SOP | Accept | 5 | SRC→SNK | | V3 | 0:01:15.916 | 16.301V/0.084A | A3 0B | |
| 220 | SOP | GoodCRC | 5 | SRC←SNK | | V2 | 0:01:15.917 | 16.301V/0.084A | 41 0A | |
| 221 | SOP | PS RDY | 6 | SRC→SNK | | V3 | 0:01:16.173 | 16.301V/0.084A | A6 0D | |

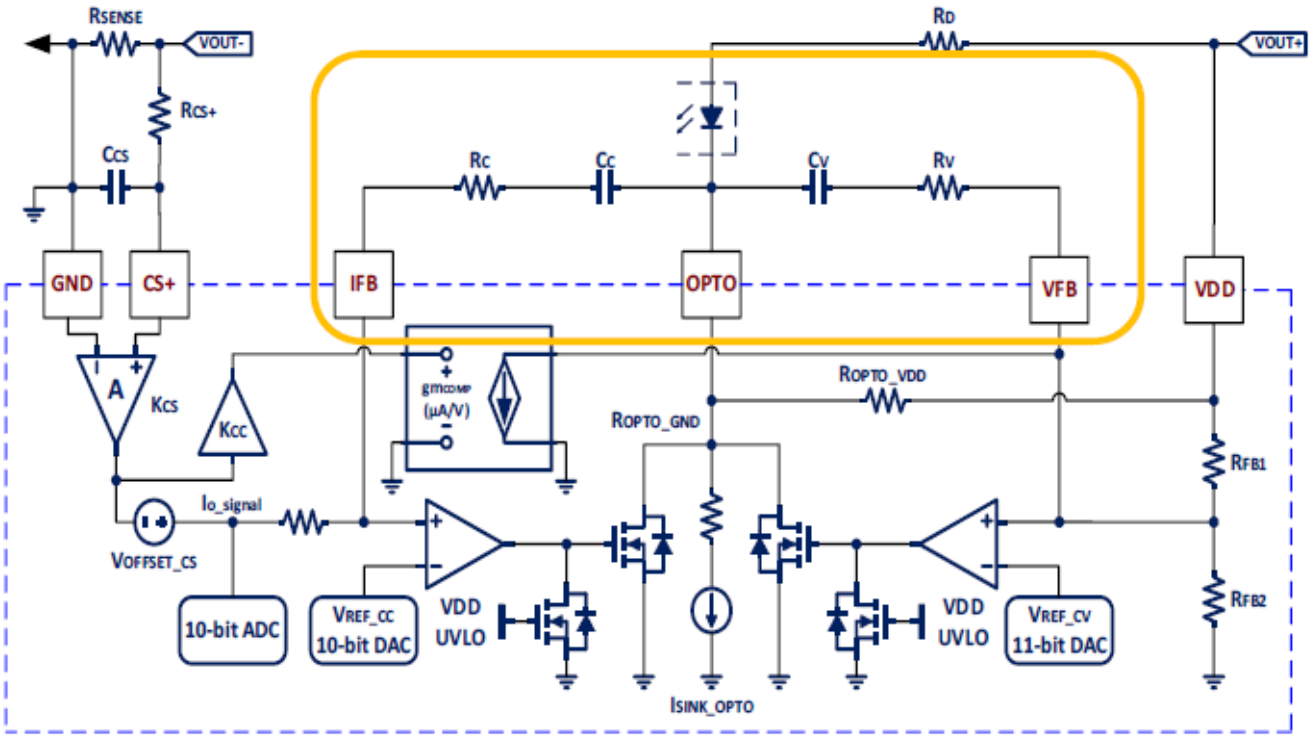

**Index205：Device request PPS 16.08V 1.1A**

**Index211：Device request PPS 19.58V 1.1A**

**Index217：Device request PPS 9V 2A**

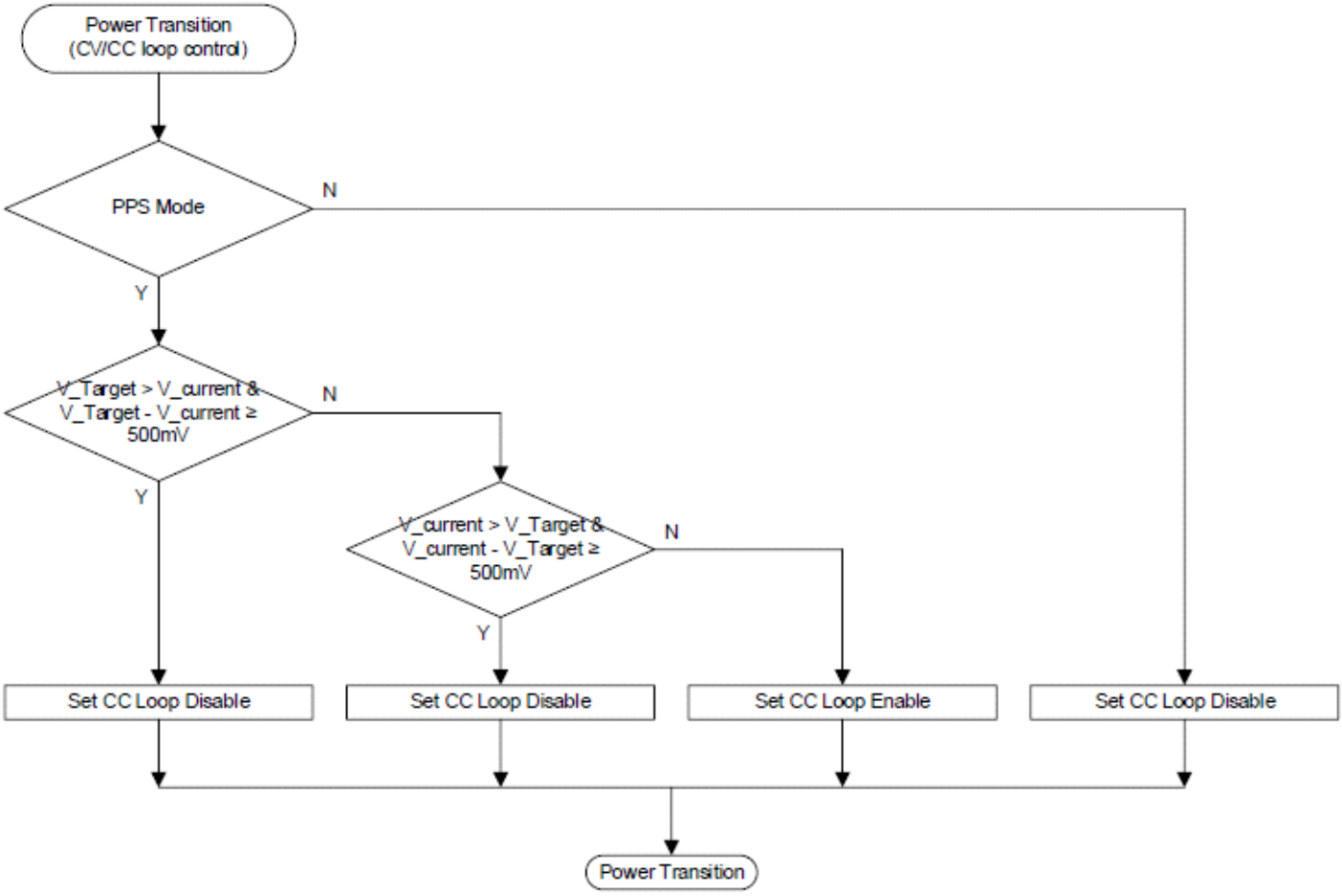
**4. PPS 模式 CV 及 CC loop 會依補償迴路的誤差量，來互搶 CV / CC loop 的優先權。**

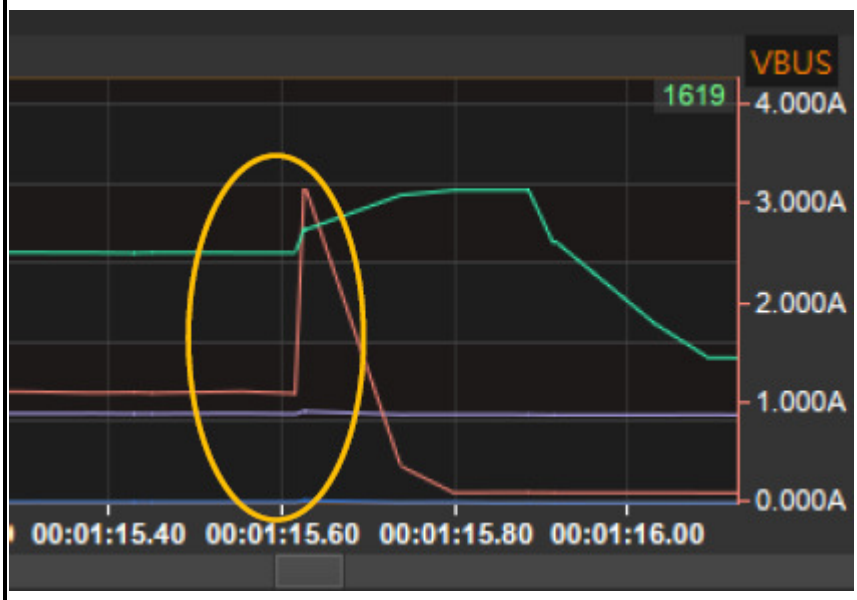
**有較大誤差量的迴路，會得到控制迴路優先權。**




**5. 為了避免 CV loop 和 CC loop 互先搶控制優先權。在目標電壓與目前電壓的電壓差大於或等於 500mV 時，會將 CC loop 設為 open，讓輸出電壓可以達到目標電壓。**

**在這種情況下，如果 device 沒有限制負載電流時，就會產生很大的電流。**

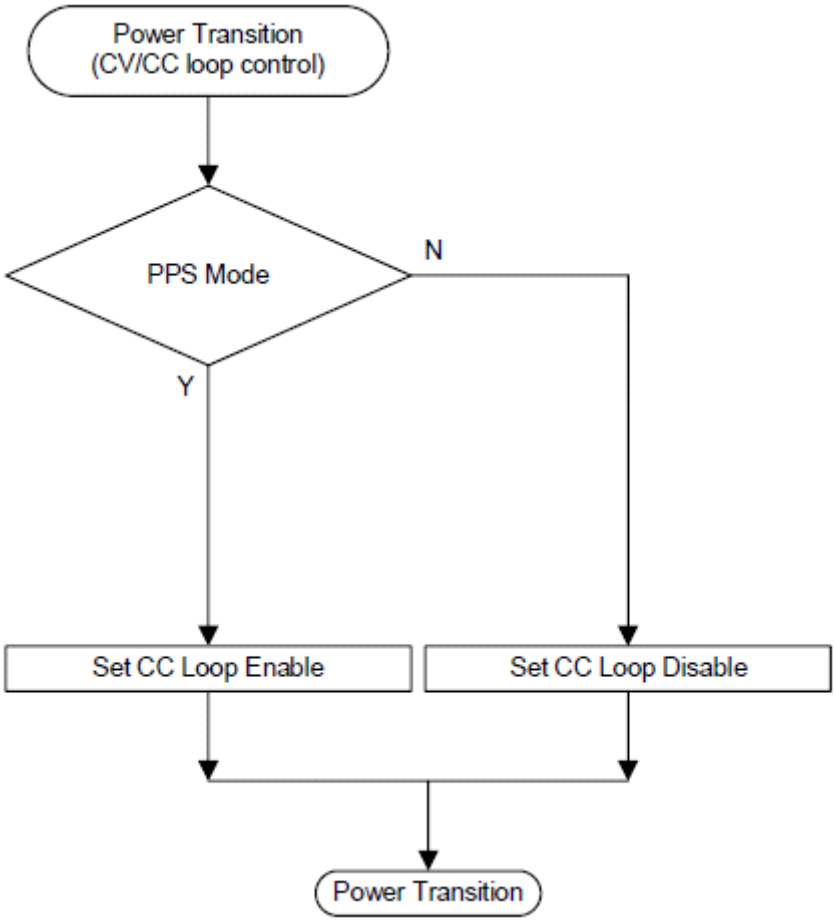

Power Transition
(CV/CC loop control)
PPS Mode
N
Y
V_Target > V_current &
V_Target - V_current ≥
500mV
N
Y
V_current > V_Target &
V_current - V_Target ≥
500mV
N
Y
Set CC Loop Disable
Set CC Loop Disable
Set CC Loop Enable
Set CC Loop Disable
Power Transition


VBUS
1619
4.000A
3.000A
2.000A
1.000A
0.000A
00:01:15.40
00:01:15.60
00:01:15.80
00:01:16.00

**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. 電池直充模式，在進入 PPS mode，固定設 cc loop enable，避免電流過大，造成充電異常。**




**2. PD IC FW 依解決方案修正改版，提供客戶樣機單體做測試，待同意後在下次生產版本導入。**

**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:<br>(**Note:** Recognize the collective efforts of the team.) |
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| **Thanks to you all！！！**<br>**PM：Laura Fang**<br>**Sales：Jennie Chiang**<br>**RD：Will Wu**<br>**Richtek：Macro Chang、Yiwei Wu、Ben Chi、Patty Wu** |

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|---|---|
| **Signature Team Leader**: | **Edward Ho** |
| **Signature by Approver:** | **Edward Ho** |