


REV.	Description	Date
00	SPEC ISSUE (NEW MODEL) ADP-420DR AAA	09/26'23
01	102A-23A064 6.12 刪除紅色圈起的 OCP 項目 6.22 此機種不需要做 OCP 載 on/off 這個條件的 stress 測試 6.23 客戶同意 abnormal 測試 Q6 損壞，此機種不做 OCP 點溫度測試	10/16'23
02	102A-23A116 6.24 Bench OCP 測試結果以 Function team 測試結果為依據 Change 4.1 input characteristics input current to less than 6.0A (同 ES 定義) Change 6.9 to OCP ,測試 OCP 時的 ATS 須修正輸出電流附載的上升斜率 4A/1sec c 40A/sec. (兼顧防止 Q6/Q7 NOP 風險與 ATS OCP 誤判風險)	10/19'23
03	102A-23B001 6.25 定義測試手法 for Q101~Q104 stress 量測方式 6.26 測試 OCP 時的生產線 ATS 須修正輸出電流附載的上升斜率 4A/1sec →30A/sec.	11/03'23
04	102A-23B136 6.26 變更 OCP ATS 測試程式斜率從 1sec/30A 變更為 1sec/70A，且為線性跳階變化	11/16'23
05	102A-23B153 ADD MODEL: ADP-420DR AAB,ADP-420DR AAC	11/20'23
06	102A-23B348 Item4.3.4 Rated input voltage, load (0A) Specification : 0.5W	11/30'23
07	102A-241009 1. Add Item 6.27 EMI 測試需在樣品底部額外鎖上 Shield 以模擬系統環境	01/03'24
08	102A-244009 1. 5.1 Hi POT Sense current 條件變更為 High-limit <10mA & Low-limit >0.4mA. 2. 5.1 Hi POT Production line (all) 測試條件變更為: 3.1(+10%)kVac 50/60Hz 3sec	04/03'24
09	102A-244148 Add Model: ADP-420DR AA,ADP-420DR AAD,ADP-420DR AAE	04/16'24
10	102A-245130 Add Model: ADP-420DR AB, ADP-420DR ABA, ADP-420DR ABB, ADP-420DR ABC	05/14'24

 台達電子工業股份有限公司 DELTA ELECTRONICS, INC.				DESCRIPTION : 測試規格(Test Specification)	
<small>THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF DELTA ELECTRONICS, INC. AND SHALL NOT BE REPRODUCED OR USED AS THE BASIS FOR THE MANUFACTURE OR SELL OF APPARATUSES OR DEVICES WITHOUT PERMISSION.</small>				MODEL NO. : ADP-420DR A SERIES	
Date	Drawn	Design (EE)	Design (ME)	DOCUMENT NAME. :	REV.
05/14'24	蘇雲巧	楊曜廷	李昱緯	TS-420DR A SERIES	10

MODEL LIST

ADP-420DR AAA	ADP-420DR AAB	ADP-420DR AAC	ADP-420DR AAD	ADP-420DR AAE
ADP-420DR AA	ADP-420DR AB	ADP-420DR ABA	ADP-420DR ABB	ADP-420DR ABC

測試注意事項內容，未經工程師許可，不可任意變更。

Test Notice contents shall not be changed or revised without engineer permission.

- 1 此測試規格用於主線測試,所有項目均需被測試,因設備或線速限制無法全數測試時,需測試 worst case, QC 需按抽樣標準測試所有 Item 不可只測試主線測試項目.

The production line shall perform all or worst test items/conditions, and

QC shall follow the sampling plan to perform all items/conditions not just the worst condition as production did.

- 2 測試注意事項：(以下為範例寫法請依據產品特性自行修正)

- 功能測試時, 12V 電子負載需設定 Von 點為 0V.
- 所有 ATS 測試時, 須偵測 CONNECTOR 端之電壓。
- 在測試時, 治具上各組輸出須有加濾波電容 22uF (Ceramic capacitor)
- ATS 測試時須外加風扇, 否則將造成 Power supply 過熱。
- Case 未組裝前的各項測試,於測試完成後須對 BULK CAP 放電。
- 12V 的 output peak load & 效率測試電壓量測需以測試板上為主。
- Brown out: 判定標準為 no damage。
- Efficiency

12V 冷機規格為 NA

熱機(至少 5min)規格為 NA



台達電子工業股份有限公司
DELTA ELECTRONICS, INC.

DESCRIPTION :
測試注意事項 (Test Specification)

THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF DELTA ELECTRONICS, INC. AND SHALL NOT BE REPRODUCED OR USED AS THE BASIS FOR THE MANUFACTURE OR SHALL OF APPARATUSSES OR DEVICES WITHOUT PERMISSION.

MODEL NO. :
ADP-420DR A SERIES

Date	Drawn	Design (EE)	Design (ME)	DOCUMENT NAME. :	REV.
05/14'24	蘇雲巧	楊曜廷	李昱緯	TS-420DR A SERIES	10

3 手調測試站：(以下為範例寫法請依據產品特性自行修正)

a. **Full Load Test:** 檢查滿載輸出是否符合規格

b. **Min. Load Test:** 檢查輕載輸出是否符合規格

Output	Output Voltage	
	Rated	Tolerance
12V	12V	11.52V~12.6V

c. **OVP Test :**

12V OVP :短路 IC53

d. **AC On/Off:**

Power supply 連續開關機 On= 2 秒, Off= 2 秒, 5 次後, 必須無損壞情形。

e. **OTP Test:**

NTC41 OTP : Short NTC41.

NTC151 OTP : Short NTC151.

Input : 85Vac /276Vac ,

Output : 12V/35A

4 Function test (ATS) procedure :

Input Specification Table:

INPUT VOLTAGE	MINIMUM	MAXIMUM	NOMINAL(RATED)
LOW RANGE	85 VAC	132 VAC	100 VAC
HIGH RANGE	180V AC	276 AC	240V AC



台達電子工業股份有限公司
DELTA ELECTRONICS, INC.

DESCRIPTION :
測試注意事項 (Test Specification)

THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF DELTA ELECTRONICS, INC. AND SHALL NOT BE REPRODUCED OR USED AS THE BASIS FOR THE MANUFACTURE OR SHALL OF APPARATUSES OR DEVICES WITHOUT PERMISSION.

MODEL NO. :
ADP-420DR A SERIES

Date	Drawn	Design (EE)	Design (ME)	DOCUMENT NAME. :	REV.
05/14'24	蘇雲巧	楊曜廷	李昱緯	TS-420DR A SERIES	10

Output Specification Table:

Output	Output Voltage	
	Rated	Tolerance
12V	12V	11.52V~12.6V

4.1 Input characteristics

	Item	Condition		Specification
1	Rated input voltage	-		100 ~ 240 Vac
2	Input voltage range	-		85 ~ 276Vac
3	Input current	12V/35A @ 100Vac		Less than 6.0A
4	Rated input frequency	-		50Hz / 60Hz
5	Input frequency	-		47 ~ 63 Hz
6	Input inrush current	85 ~ 276 Vac Rated load. (Test with 3KV AC Source).	Ta= 25°C Cold start	Less than 140A
			Ta= 40°C Repeat AC ON<=>OFF (5VSB: 120mA load, 12V OFF)	Less than 180A/2msec

4.2 Output characteristics**Output System:****Output Characteristics:**

Below output capacitance (smallest capacity) should be satisfied

12V : 22uF (Ceramic capacitor)

Output	Output Voltage	Output Current			Ripple & Nioise (at rated load)
	Tolerance	Peak	Rated	Min.	Ta= -5~40°C
12V	+5% -4%	90A/30msec	35A	0A	150mVp-p,max
12V	+10%~-10%	Rated load to Peak load.			

full load(300ms)~peak load(30ms) °



台達電子工業股份有限公司
DELTA ELECTRONICS, INC.

DESCRIPTION :

測試注意事項 (Test Specification)

THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF DELTA ELECTRONICS, INC'. AND SHALL NOT BE REPRODUCED OR USED AS THE BASIS FOR THE MANUFACTURE OR SHALL OF APPARATUSES OR DEVICES WITHOUT PERMISSION.

MODEL NO. :

ADP-420DR A SERIES

Date	Drawn	Design (EE)	Design (ME)	DOCUMENT NAME. :	REV.
05/14'24	蘇雲巧	楊曜廷	李昱緯	TS-420DR A SERIES	10

Output	OCP	OVP
12V	90A~112.5A	15.6V,max

Other characteristics:

	Item	Condition and Specification		
1	No load operating	Input range: 85~ 276 Vac No function error, no damage, and output voltage should be within regulation.		
2	Over / Undershoot	Input range: 85 ~ 276 Vac Output voltage should be within +10%~-10% of rated output voltage.		
3	Protective function	OCP	The 12V has been detected abnormal (12V OC/OV/OT/UV), 12V output should be shut down immediately.	
		OVP		
		OTP		
		Protection functional operation (Signal and power output)		
4	Recovery from protection	Remove latch function after the AC OFF and within 3 minutes.		
5	Transient response	12V	Input range: 85 ~ 276 Vac [12V load change] Change range : 100%~40%, 90%~30%, 80%~20%, 70%~10% Change frequency : 10Hz & 20kHz. Change rate : 1.0A/use	Output voltage should be regulated within 12V +5% -4%.



台達電子工業股份有限公司
DELTA ELECTRONICS, INC.

DESCRIPTION :
測試注意事項 (Test Specification)

THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF DELTA ELECTRONICS, INC'. AND SHALL NOT BE REPRODUCED OR USED AS THE BASIS FOR THE MANUFACTURE OR SHALL OF APPARATUSES OR DEVICES WITHOUT PERMISSION.


MODEL NO. :
ADP-420DR A SERIES

Date	Drawn	Design (EE)	Design (ME)	DOCUMENT NAME. :	REV.
05/14'24	蘇雲巧	楊曜廷	李昱緯	TS-420DR A SERIES	10

4.3 Common specifications

Item			Condition	Specification
1	Switching frequency		100Vac input. Rated load.	-
2	Power factor		-	IEC61000-3-2.
3	Life		Rated input voltage. Ambient temperature, constant humidity.	70,000Hr or more with system. => 20,000Hr, 12V/rated load (FAN cooling). => 50,000Hr, 12V/3A (air convection).
4.	Efficiency	Light load w/o Fan	Rated input voltage, load (0A).	0.5W
			Rated input voltage, load (0.008A).	NA
			Rated input voltage, load (0.009A).	NA
			Rated input voltage, load (0.010A).	NA
			Rated input voltage, load (0.011A).	NA
			Rated input voltage, load (0.012A).	NA
			Rated input voltage, load (0.01A).	NA
			Rated input voltage, load (0.025A).	NA
			Rated input voltage, load (0.05A).	NA
			Rated input voltage, load (0.1A).	NA
			Rated input voltage, load (0.2A).	NA
			Rated input voltage, load (0.3A).	NA
			Rated input voltage, load (0.4A).	NA
			Rated input voltage, load (0.6A).	NA
			Rated input voltage, load (1A).	NA
		Normal load With Fan	Rated input voltage, load (10A).	NA
			Rated input voltage, load (20A).	NA
			Rated input voltage, load (31A).	NA
			Rated input voltage, load (35A).	NA
5	Parts temperature		Rated input voltage. System ass'y. Ta=40°C	There is enough de-rating of temperature for all components.
6	t_dur1	t_dur1	Rated input voltage 12V: 20A	50Hz 1.5 cycle(=30ms). Output voltage shall be satisfy electric characteristic.
7	Leakage current		Rated input voltage.	100uArms or less.
8	Input discharge time		Input 121V or less, from AC power OFF to 37% rated.	1 sec or less.
			Input 122V or more, from AC power OFF to 45V.	1 sec or less.
9	Overvoltage apply test		400Vac input / 2sec.	No safety hazard.

Note 1: After completes required DVT test matrix, identifies and selects the worst case condition for the Production MTR. It is not required that all test conditions be tested. Example: If worst case condition for Output Ripple is minimum input voltage and maximum dc load, then that is the test condition to be used.

 台達電子工業股份有限公司 DELTA ELECTRONICS, INC.				DESCRIPTION : 測試注意事項 (Test Specification)	
THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF DELTA ELECTRONICS, INC'. AND SHALL NOT BE REPRODUCED OR USED AS THE BASIS FOR THE MANUFACTURE OR SHALL OF APPARATUSES OR DEVICES WITHOUT PERMISSION.				MODEL NO. : ADP-420DR A SERIES	
Date	Drawn	Design (EE)	Design (ME)	DOCUMENT NAME. :	REV.
05/14'24	蘇雲巧	楊曜廷	李昱緯	TS-420DR A SERIES	10

4.4 Power ON/OFF (Sequential control & Timing)

Item	Condition	Specification
t_on	AC ON to 12V turn on time	output voltage can be regulated to 12V+5%, -4% within 2S.
t_off	12V output voltage from 100% to 10%.	12V output voltage from 100% to 10%.
Tur t_r	0V to 12V rise time	12V output voltage from 5% to 95% within 2~20msec. Load 0A : 不判定
t_9V_keep	When AC off , 9V keep time.	12V/1A , 9V keep time 1s (min)

5. Safety

Hi-POT test :

1	HI-POT	Input between primary and secondary. Primary 是 L,N, Second 是 12V & GND PG1 & PG2 需連接在一起. QA (sampling) : 3.0kVac 50/60Hz 60sec Production line (all): 3.1(+10%)kVac 50/60Hz 3sec	IEC60950-1 item 5.2 Sense current: High-limit <10mA & Low-limit >0.4mA. Arcing current : EVT1: 5mA, EVT2,3/DVT: 8mA, PVT/MP:10mA Without damage to parts.
2	Insulation resistance	500 Vdc input between primary and secondary.	10 Mohm or more.
3	ESD	ESD 僅針對二次側 GND 測試 for 客戶要求	
4	RFI	AC 線需垂直於地面	

6. Other

6.1 12V 測試 dynamic load 的時候需按照客戶規格切換做測試，不做 0%到 100% load 切換.

6.2 Common mode noise : 客戶暫無規格不須測試.

6.3 Loop gain (12V)

擾動電壓 : 產品不當機即可.



台達電子工業股份有限公司
DELTA ELECTRONICS, INC.

DESCRIPTION :

測試注意事項 (Test Specification)

THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF DELTA ELECTRONICS, INC. AND SHALL NOT BE REPRODUCED OR USED AS THE BASIS FOR THE MANUFACTURE OR SHALL OF APPARATUSES OR DEVICES WITHOUT PERMISSION.

MODEL NO. :

ADP-420DR A SERIES

Date

Drawn

Design (EE)

Design (ME)

DOCUMENT NAME. :

REV.

05/14'24

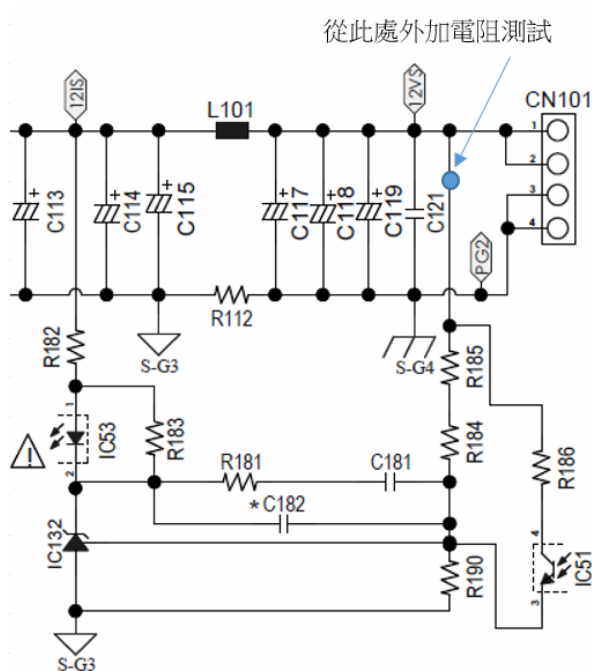
蘇雲巧

楊曜廷

李昱緯

TS-420DR A SERIES

10



6.4 Ripple voltage (低溫) 需 power 穩定後才能讀值.

6.5 ESD : 每打一次 ESD,就需對治具放電一次.

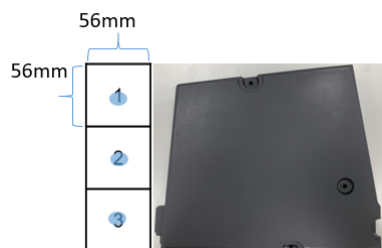
6.6 Acoustic noise test

測試 3 個點 , 藍點為麥克風位置.

Input : 100Vac ,240Vac

Output : 0~2A , 0.015A, 0.25A

Spec : < 50dB(A)



台達電子工業股份有限公司
DELTA ELECTRONICS, INC.

DESCRIPTION :
測試注意事項 (Test Specification)

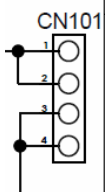
THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF DELTA ELECTRONICS, INC'. AND SHALL NOT BE REPRODUCED OR USED AS THE BASIS FOR THE MANUFACTURE OR SHALL OF APPARATUSES OR DEVICES WITHOUT PERMISSION.

MODEL NO. :
ADP-420DR A SERIES

Date	Drawn	Design (EE)	Design (ME)	DOCUMENT NAME. :	REV.
05/14'24	蘇雲巧	楊曜廷	李昱緯	TS-420DR A SERIES	10

6.7 OCP test：當 OCP 測試時，每測試一次 OCP 後，需空載 Burn in 1min，再測下一個 OCP，避免過熱影響準確性。

6.8 CN101

Pin_1	Output (+)		
Pin_2	Output (+)		
Pin_3	Output (-)		
Pin_4	Output (-)		

6.9 OCP ,測試 OCP 時的 Function team ATS 須修正輸出電流附載的上升斜率 4A/1sec → 40A/sec.

6.10 效率測試時在 $I_o=0.025A$ 時需要再 0.025A 等 3 分鐘之後再積分 1 分鐘做測試.

6.11 在測試 0A Pin 的時候，須先 12V/0A 等 5 分鐘後在開始測

6.12 Peak load burn in test condition :

full load(5S)~peak load(30ms)。

6.13 OTP 測試

Fan voltage=12V(8.5CFM)，Fan voltage=11.5V(8.5*0.8=6.8CFM),所以測試時 Fan voltage 用 11.5V 做測試..

6.14 EMI/RFI 測試時使用與客人一樣的負載做測試 $I_o=20.3A$.


6.15 變更產線 ATS ripple noise 測試條件 12V/0A → 12V/1A for 客戶要求

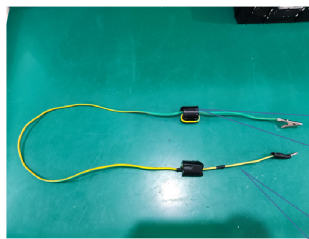
6.16 產線 ATS 滿載冷機效率測試條件 100VAC~240Vac;12V/35A > 84.5% for 客戶要求

6.17 EMI/RFI 測試時使用與客人一樣的接地線設置，需在接地線兩端纏繞夾 core

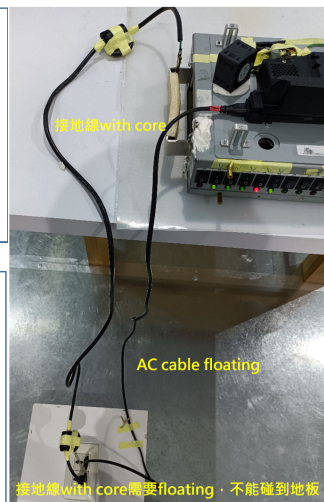
6.18 變更低溫測試條件 12V/滿載開機改成系統負載開機 20.3A。

6.19 增加接地線設置輔助說明。

 台達電子工業股份有限公司 DELTA ELECTRONICS, INC.				DESCRIPTION : 測試注意事項 (Test Specification)	
THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF DELTA ELECTRONICS, INC. AND SHALL NOT BE REPRODUCED OR USED AS THE BASIS FOR THE MANUFACTURE OR SHALL OF APPARATUSES OR DEVICES WITHOUT PERMISSION.				MODEL NO. : ADP-420DR A SERIES	
Date	Drawn	Design (EE)	Design (ME)	DOCUMENT NAME. :	REV.
05/14'24	蘇雲巧	楊曜廷	李昱緯	TS-420DR A SERIES	10



Core P/N:K5B RC 26*30*13-MB



6.20 9V hold-up time 測試項目，ATS 100%測試，但是不做 CPK 判定，Bench function team 會做波形抓取並判定。

6.21 此機種不需要做 OCP 載 on/off 這個條件的 stress 測試

6.22 客戶同意 abnormal 測試 Q6 損壞，此機種不做 OCP 點溫度測試

6.24 Bench OCP 測試結果以 Function team 三溫測試結果為依據

6.25 定義測試手法 for Q101~Q104 stress 量測方式，如下：


開關兩路都要吃錫

若發生切至 O 時，輸出仍短路，需要再換一顆開關



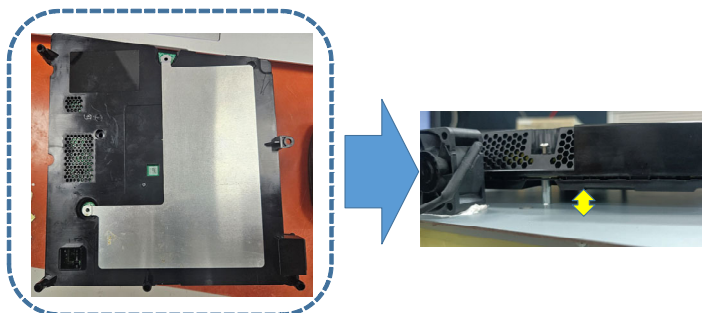
開關 P/N: 5084B-B
4P無燈斜面開關 (黑殼 黑蓋)

6.26 OCP ,測試 OCP 時的生產線 ATS 須修正輸出電流附載的上升斜率 30A/1sec → 70A/sec.(線性跳階變化)


 台達電子工業股份有限公司 DELTA ELECTRONICS, INC.				DESCRIPTION : 測試注意事項 (Test Specification)	
THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF DELTA ELECTRONICS, INC'. AND SHALL NOT BE REPRODUCED OR USED AS THE BASIS FOR THE MANUFACTURE OR SHALL OF APPARATUSES OR DEVICES WITHOUT PERMISSION.				MODEL NO. : ADP-420DR A SERIES	
Date	Drawn	Design (EE)	Design (ME)	DOCUMENT NAME. :	REV.
05/14'24	蘇雲巧	楊曜廷	李昱緯	TS-420DR A SERIES	10

6.27 EMI 測試需在樣品底部額外鎖上 Shield 以模擬系統環境，如下

新的模擬系統的鐵板



DELTA CONFIDENTIAL

 台達電子工業股份有限公司 DELTA ELECTRONICS, INC.				DESCRIPTION : 測試注意事項 (Test Specification)	
THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF DELTA ELECTRONICS, INC'. AND SHALL NOT BE REPRODUCED OR USED AS THE BASIS FOR THE MANUFACTURE OR SHALL OF APPARATUSES OR DEVICES WITHOUT PERMISSION.				MODEL NO. : ADP-420DR A SERIES	
Date	Drawn	Design (EE)	Design (ME)	DOCUMENT NAME. :	REV.
05/14'24	蘇雲巧	楊曜廷	李昱緯	TS-420DR A SERIES	10