

主題
名稱

Server 主機板量測

內容
摘要

本部門主要在做 Server power 測試與設計，測試有分 CPU、DDR、POL、CPU 方面，工讀生主要負責 POL 的部分，POL 測項包括 Efficiency & Power Loss、Static mode ripple、Bode Plots、Transient Response Test、power up/down、Input Voltages Characterization、Output Over Current Protection、Output Over Voltage Protection、Component Stress Tests、pre-bias、Gate Voltage Stress test。客戶主要是 HP，使用 intel CPU，為了讓測試數據達到客戶和 report 的需求、依照不同項目，所測試的內容都不一樣，板子版本的不同，測的數據也會有所改變，需要不斷的測試和改良。

一、Critical item

一份 POL 測項有十多個，就挑 Critical item 測項做說明，Critical item 測項有 Static mode ripple、Bode Plots、Component Stress、POL 測項就有包含 Critical item 測項。

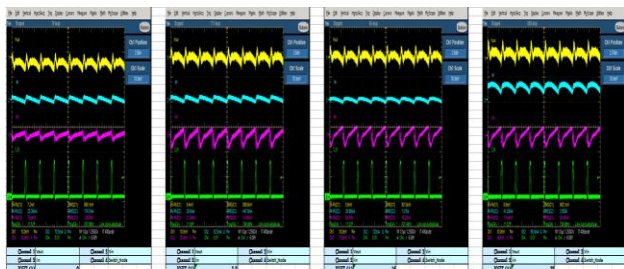


實際電路圖

二、Static Mode Ripple

下圖為 Static Mode Ripple 量測方法，此外量測 Ripple 測項，Vout 端需焊上 BNC 接頭。

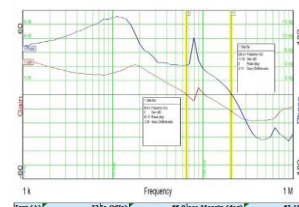
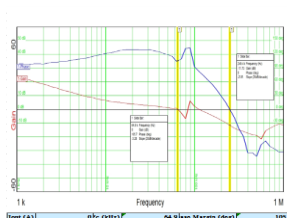
Output Voltage Ripple & Input Current Ripple	
The purpose of this test is to measure and verify the ripple, if any, of the output voltage, input voltage & input current at light, mid & heavy load conditions.	
Perform the test at minimum, nominal & maximum input voltage.	
Monitor the following signals on an oscilloscope:	
1	Input Voltage (V _{IN})
2	Input Current (I _{IN})
3	Input Voltage (V _{IN})
4	Output Current (I _{OUT})
5	Switching Node
Use a passive single ended probe (tip & ring) on the output voltage. Set the BW to 20 MHz and add an offset to the channel so that the voltage waveform is centered on the screen. Do the same to measure the input voltage.	
Use a current probe to measure the input current. Set the BW to 20 MHz. Use a single ended probe on the switching node. Trigger off of the switching node.	
Set the scope to Infinite Persistence ON.	
Insert waveforms of the switching node, output voltage ripple, input voltage ripple & input current ripple for all loads. Label the waveforms accordingly.	



三、Bode Plots

下圖為 Bode Plots 量測方法，需在 Vout 端接回 IC FB 端的 10Ω 兩端接上頻率響應分析儀。

The purpose of this test is to verify the stability of the converter under various load conditions.	
Verify the board to be used with the gain phase analyzer by adding a suitable resistor in series with the Output voltage sense line. Connect the analyzer leads across this resistor.	
Perform the test at two settings:	
1	Control Input voltage and verify the recommended output capacitance.
2	Control Input voltage and verify the recommended output capacitance. Use an 0.1µF capacitor to increase the output capacitor bank.
Insert the probe pins for the external load conditions and after the pins accordingly.	
Repeat the Power Manager on-off frequency and Power Manager for all conditions in the table below.	
If using substitute or open of the input filter, measure the output voltage ripple at the output of the inductor. This ripple should be limited to 5% of the nominal value.	



四、Component Stress

下圖為 Component Stress 量測方法，主要是針對電感 2nd Source 量測。

Component Stress Tests

The purpose of this test is to verify the stability of the converter.	
Perform the following tests to verify the conditions of the components:	
1	Inductor Saturation
2	Inductor Core Loss

VOUT (V)	I _{OUT} SET (A)	I _{OUT} RMS (A)	I _{OUT} RIPPLE E (App) (A)	I _{OUT} PEAK (A)	Inductor Current Saturation	Inductor Core Loss
0.9	2.0	32.82	6.4	36	PASS	PASS
0.9	4.0	38.77	6.8	42.2	PASS	PASS

