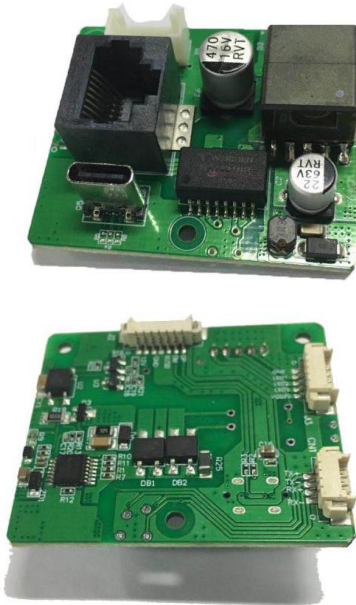


Power-Over-Ethernet Module



2.Scope of application

- IEEE 802.3at Compatible Devices
- Video and VoIP Phone
- PoS terminal, RFID terminal
- Fiber to Home (FTTH) Terminal
- Security Camera

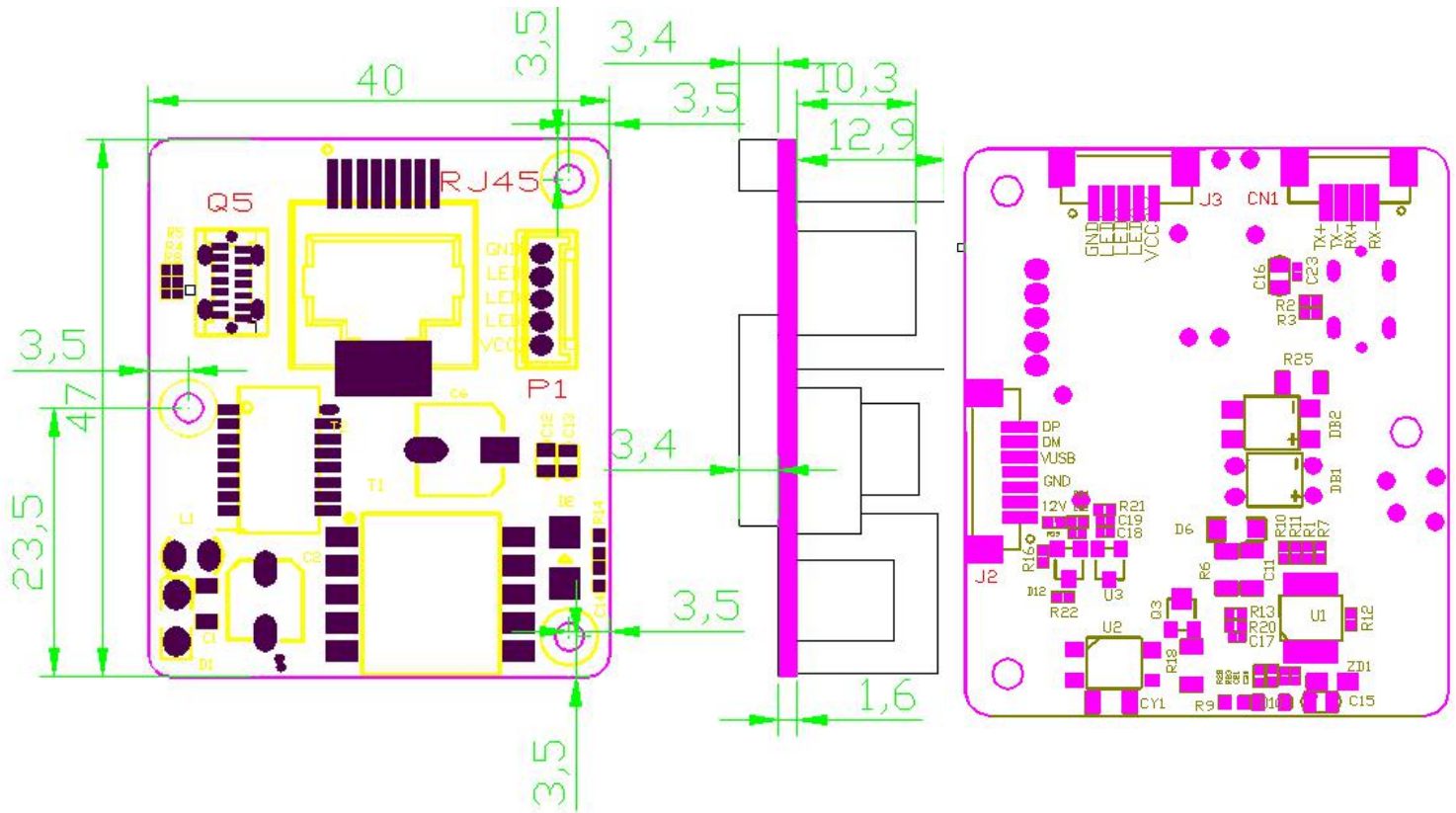
1. Product characteristics

- Compatible with IEEE802.3at standard devices.
- 42V~100V wide operating voltage range.
- Maximum output power up to 13W; rated output: 12V/1.1A.
- The output ripple is less than 150 mV.
- Conversion efficiency can be as high as 88% (input 48V, output)12V@1.1A).
- Combined with several protection functions such as temperature control protection, current limit, high voltage internal switch, etc.
- Input/Output: isolate 2000Vdc.
- High reliability: design meets 5 million hours average failure interval

3. describe

- ▶ The POE WC-PD13U120 series module combines PSE network signal with power separation module. It can transmit data and power to non-PoE receiving devices without additional separators. The signal transmission is up to 100 meters in 10/100Mbps.
- ▶ It can be freely matched with more than 85% PC modules in the market, and can also be used to power and separate the network for other devices that need PoE function.
- ▶ The WC-PD13U120 control circuit provides the power device (PSE) required by PoE for compatibility signature and power classification, has complete protocol detection and then adds 13W power to the port.
- ▶ Auto Maintain Power Characteristics (MPS) - Auto-adjust MPS for Class 1-2 or Class 3-4 PSE - Supports ultra-low power standby mode, main adapter priority input, etc. Also has a long soft start cycle for efficient DC/DC converters to ensure IEEE802.3at start-up requirements are met.

4. Pin foot definition



Dimensions are physical (mm)

port	Name	describe
1	Q5	Reserved serial port corresponds to J2 port and supports QC protocol for power supply and communication.(Defined at 4Pin port prints)
2	RJ45	Transmit 10/100MbpsTX, RX communication for network communication interface and CN1 port serial port.
3	P1	This interface is connected to the J3 interface to form a reserved serial port.
4	J2	POE power output and TYPE-C port are also connected to it.
5	J3	This interface is connected to the J3 interface to form a reserved serial port.
6	CN1	It is the network signal TX+, TX-, RX+, RX-transport interface.

5. Electrical characteristics

5.1 Absolute maximum rating parameter

No	parameter	Symbol	MIN	MAX	Units
1	Input DC Voltage	V_{CC}	38	57	V
2	DC Voltage Surge 1ms	V_{SURGE}	-0.6	65	V
3	ambient temperature	T_S	-40	+80	°C

*Exceeding the above rating may cause permanent damage to the product. Functional operations under these conditions are not recommended.

The maximum rating assumes free air flow.

5.2 Recommended working conditions

No	parameter	Symbol	MIN	MAX	Units
1	input voltage	V_{IN}	38	57	V
2	Low Voltage Lock	V_{LOCK}	35	-	V
3	working temperature	T_{OP}	-40	80	°C

*Applicable only to the maximum operating temperature of WC-PD13U120.

5.3 DC characteristics

No	parameter	Symbol	MIN	TYP	MAX	Units	Test Opinions
1	Standard Output Voltage	$+V_{DC}$	11.7	12.0	12.2	V	$V_{IN}=48v$
2	Output Current ($V_{IN}=48V$)	P_{WR}	-	1	1.4	A	Wide voltage input 38-57V
3	Power adjustment rate	V_{LINE}	-	0.1	-	%	@50% 负载
4	Load Adjustment Rate	V_{LOAD}	-	1	-	%	@ $V_{IN}=48V$
5	Ripple Output Noise	V_{RN}	-	100	150	mVp-p	@Maximum Load
6	Minimum Load	R_{LOAD}	5	10	-	mA	
7	Short circuit duration	T_{SC}	-	-	∞	sec	
8	Efficiency (load 80%)	E_{FF}	-	86	-	%	
9	Isolation Voltage (I/O)	V_{ISO}	-	-	2000	V_{PK}	
10	temperature coefficient	T_c	-	0.02		%	Per °C
11	efficiency	η	84	8	∞	%	

1: Typical number is 25 C, nominal voltage is 48V, for auxiliary design only.

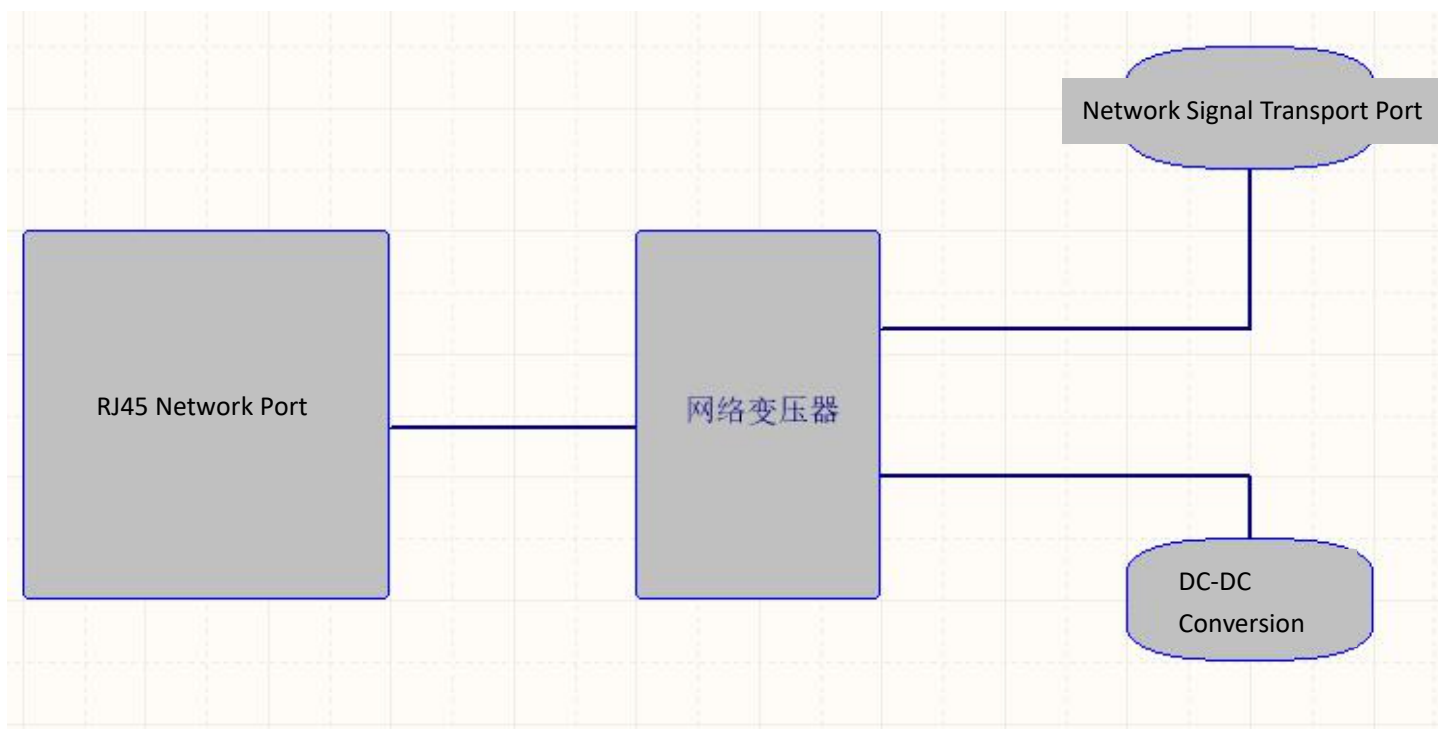
2: Output ripple and noise can be reduced by an external filter, see the application instructions.

3: If operated under the specified minimum load, the module emits audible noise and may cause PSE malfunction.

6. Functional Description

6.1 input

WC-PD13U120 is compatible with devices that use different power options, see Figure: Typical system diagram. Specify that the PSE applies power to both outputs simultaneously (see IEEE802.3at for more information).



Typical System Diagram

6.2. PD Signature

When WC-PD13U120 is connected to Category 5 cables, it will automatically go to the Power Supply Device (PSE) or the Midspan Device when required

Display the power device (PD) signal. The device then identifies a power supply device connected to the line and supplies power.

6.3. Quarantine

Meets the security isolation requirements of section 33.4.1a of IEEE802.3at. Device (PD) must pass IEC 60950 Section 6.2 Electrical strength test. This requires a) 1500V ACT est or b)

1500V pulse test. WC-PD13U120 specification meets 1500Vdc pulse test. At least one track on either side of the isolation barrier. A gap of 3 mm is also important.

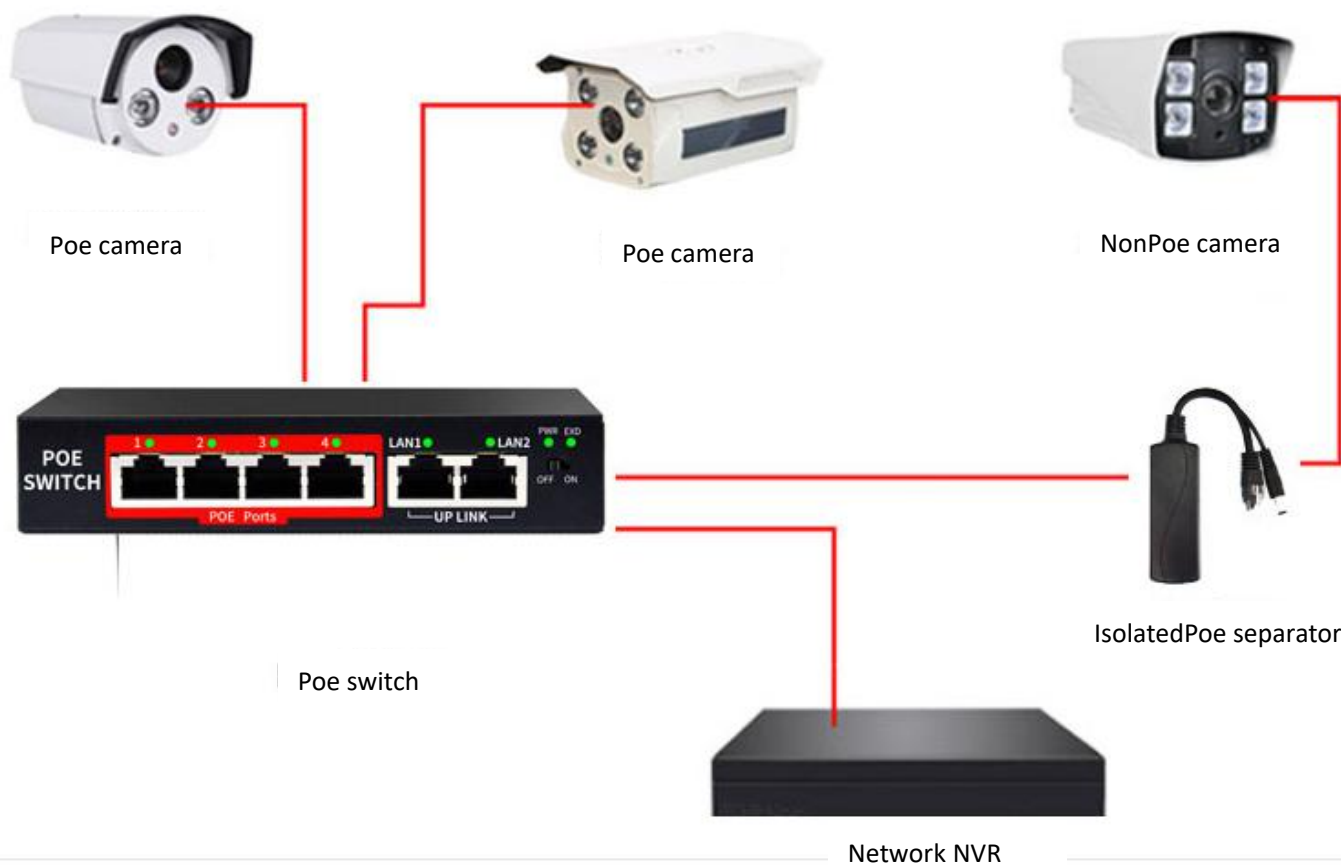
6.4. Power Classification

WC-PD13U120 is suitable for Level 3 (13W) operation. Refer to other PoE products for alternative power programming.

6.5. DC/DC Converter

The WC-PD13U120 converter provides adjustable low ripple and low noise output with superior reliability and circuit protection built in.

6.6. Typical connections



Typical application diagram

7. Operating temperature range

- Because WC-PD13U120 is a power element that generates heat, it is important to consider heat loss during the design phase.
- The core of WC-PD13U120 is a DC/DC converter, which produces heat like other power sources. The heat generated by the module will depend on the load required to drive and the input voltage provided by PSE. The information shown in this section of the data table refers to the rated 48Vdc input voltage provided by SE.
- The maximum ambient operating temperature of WC-PD13U120 is 60 C. These results are generated in static air without any heat loss and can improve the performance of the WC-PD13U120 by forcing air flow over the parts or by using a radiator.
- WC-PD13U120 has built-in thermal protection function, which reduces the output power when the operating temperature is over a certain range. It is recommended that the module be powered by PSE or midspan devices that meet IEEE802.3at standard.

➤

Because each application environment is different, it is not possible to give fixed and absolute temperature recommendations. However, the assignment used

Any housing must provide adequate ventilation for the WC-PD13U120.

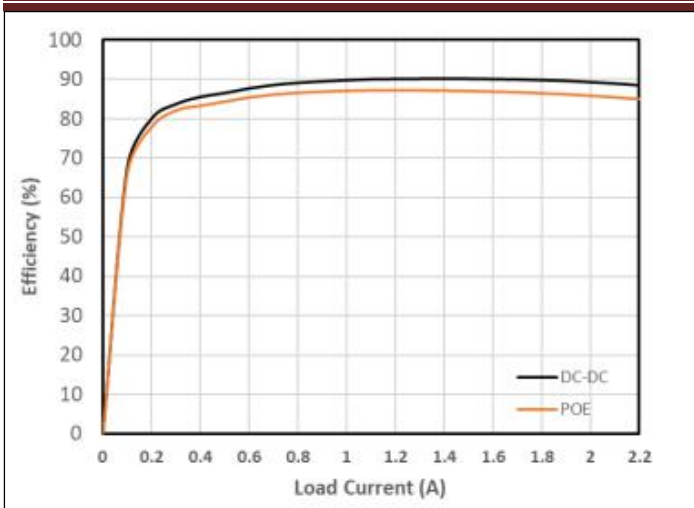
8. Thermal limit/protection

- ◆ WC-PD13U120 uses internal temperature monitoring to provide heat protection current or cut off power supply to prevent exceeding its preset setting Temperature limit.
- ◆ Two-stage thermoelectric current restriction reduces the IC working current limit by 50%, reaching 145_C and above 165_C. Stop working
- ◆ The normal current limits of both are restored when the temperature returns below 125_C.

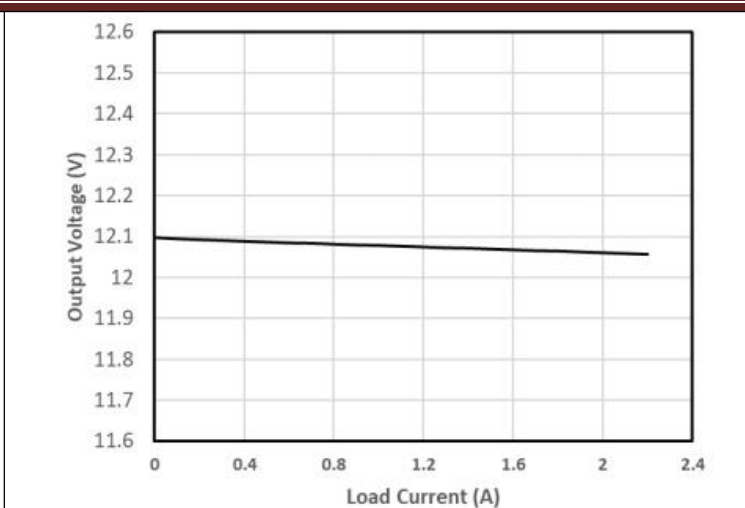
8. Test waveform diagram

Typical features: $V_{out}=12$

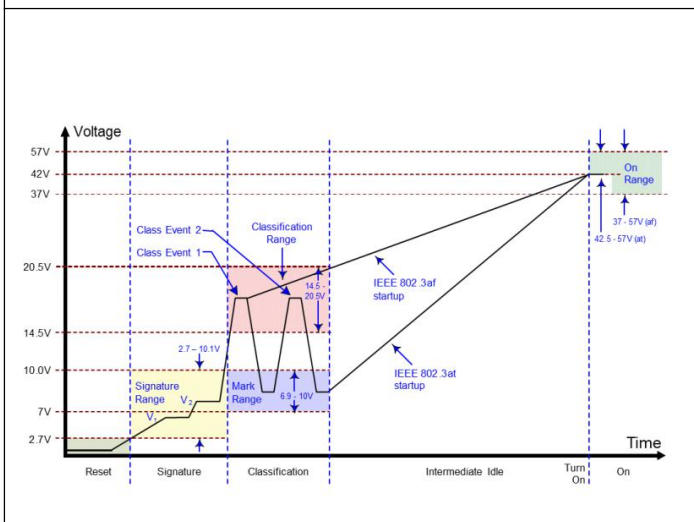
<p>Noise ($V_{in}=42V$, $I_o=1.1A$, 5~20MHz bandwidth)</p>	<p>transient response ($V_{in}=42V$ $I_o=50\% \sim 100\% \sim 50\%$)</p>
<p>Noise ($V_{in}=48V$, $I_o=1.1A$, 5~20MHz bandwidth)</p>	<p>transient response ($V_{in}=48V$ $I_o=50\% \sim 100\% \sim 50\%$)</p>
<p>Noise ($V_{in}=57V$, $I_o=1.1A$, 5~20MHz bandwidth)</p>	<p>transient response ($V_{in}=57V$ $I_o=50\% \sim 100\% \sim 50\%$)</p>



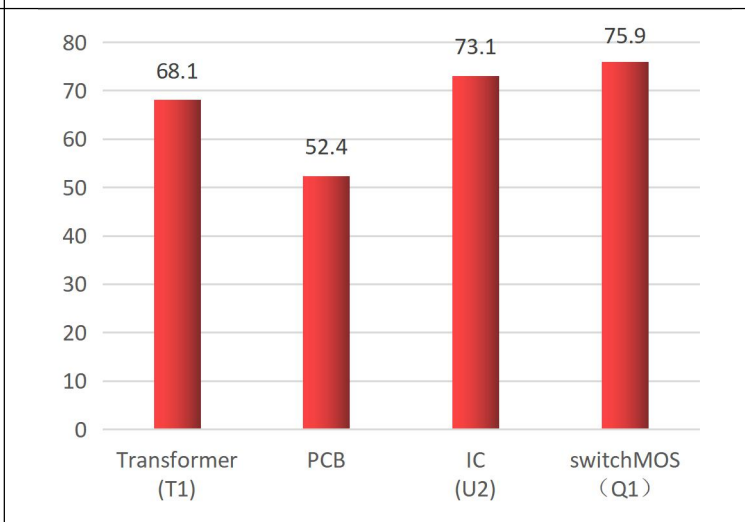
efficiency(VOUT = 12 V)



Output Voltage (Input 48V)

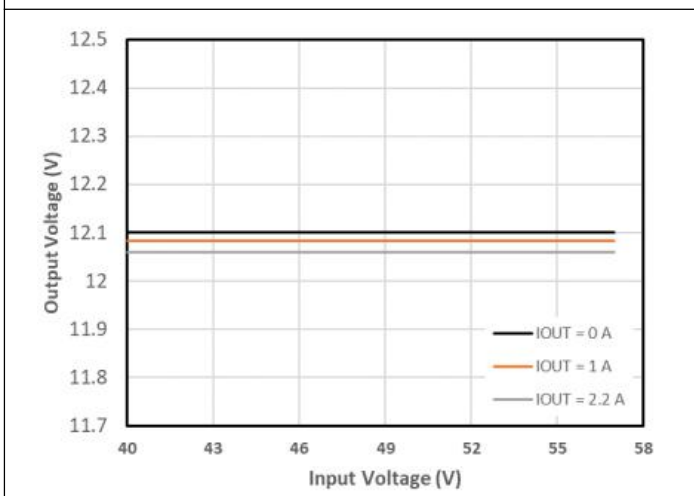


Power supply process

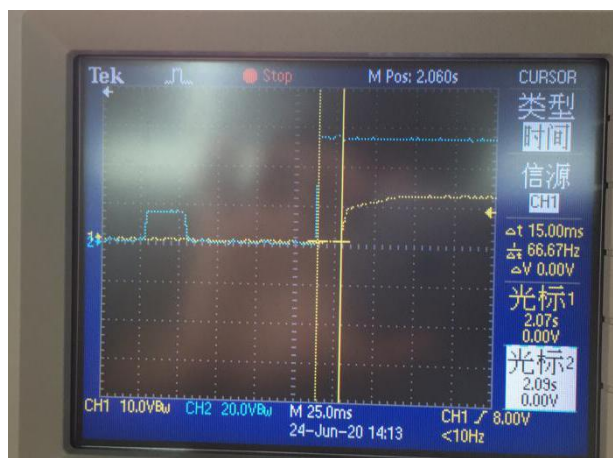


Component maximum temperature

Conditions: Ambient temperature: 29 C; Output power: 12V/1.1A; Frequent: 3H



Input Voltage-Output Voltage



Output delay response

Ch1: output 12V / 1.1A; CH2: input 48V