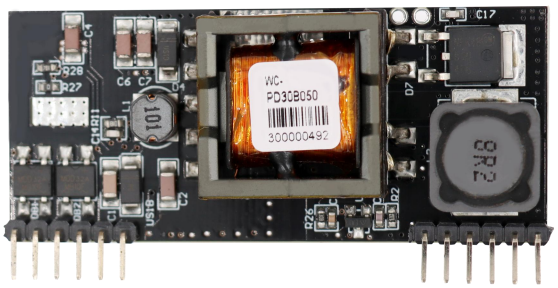
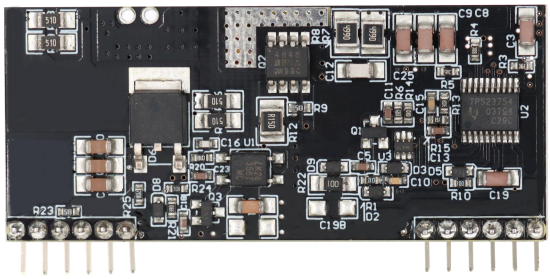
30W PD-5V





Product characteristics

- Compliance with IEEE802.3at standard
- 42V~57V wide operating voltage range
- Maximum output power up to 30W; Rated output: 5V/6A
- The output ripple is less than 200 mV
- Conversion efficiency can be as high as 85% (input: 48V output：5V@6A)
- It has excellent reliability and circuit protection such as over current, short circuit, under voltage and surge
- PCB standard size: 62*27*14.1mm
- Input/Output: isolate 1500Vdc
- Class 4 IEEE802.3 PD
- High reliability: The design meets the 5 million hour average failure interval

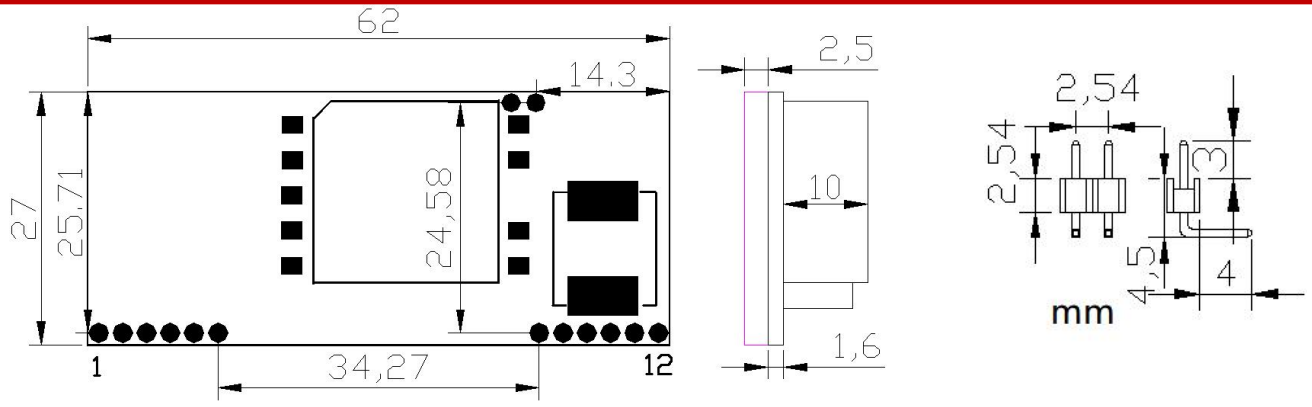
Scope of application

- Video and VoIP Phone
- RFID Reader
- Multiband Access Point
- Surveillance camera
- Multiband Access Point

Describe

- The WC-PD30B050 PoE (power over Ethernet) module is a traditional Category 5 and Category 6 twisted pair Ethernet power supply module based on the IEEE 802.3AT PoE standard
- Designed to extract power from power supply equipment (PSE) through conventional twisted pair cables over Category 5 and Category 6 Ethernet cables. Module inputs comply with IEEE803.2AT signature recognition and classification standards
- Pre configured as a Type 2 Level 4 device, allowing the module to obtain class 4 power from the PSE, with a rated output voltage of 5V. Efficient DC/DC converters can achieve approximately 85% efficiency and operate within a wide input voltage range, with low ripple and low noise outputs. The DC/DC converter also has built-in output overload and short circuit protection, and provides 1500Vdc (input/output) isolation barrier

Mechanical dimensions



Unit： mm ; Unmarked tolerances：±0.5

pin definition

Pin	Name	describe
1	VA1	Connect to RJ45 network port (TX) 1 and 2 pin network transformer central taps. (The module carries two sets of rectifier bridges to suit different PSE power supply directions)
2	VA2	Connect to RJ45 network port (TX) 3 and 6 pin network transformer center taps. (The module carries two sets of rectifier bridges to suit different PSE power supply directions)
3	VB1	Connect to RJ45 network port 4 and 5 pins (100Mbps), or connect to RJ45 network port (BI) 4 and 5 pins network transformer center tap (1000Mbps) (the module is equipped with two sets of rectifier bridges to adapt to different PSE power supply directions)
4	VB2	Connect to RJ45 network port 7 and 8 pins (100Mbps), or connect to RJ45 network port (BI) 7 and 8 pins network transformer center tap (1000Mbps) (the module is equipped with two sets of rectifier bridges to adapt to different PSE power supply directions)
5	GND	The pin is (DET) pin negative GND
6	DET	This pin can be configured with a class level (default to class 4)
7,8	Vout-	This pin is the module output negative pole
9,10	Vout+	This pin is the module output positive pole
11	TRIM	Output voltage can be fine-tuned by this pin pin to output positive or negative parallel rated resistance
12	NC	Reserve fixed pin

Electrical Characteristics

Absolute maximum rating parameter

No	parameter	Symbol	MIN	MAX	Units
1	Input DC voltage	VCC	42	57	V
2	DC Voltage Surge 1ms	VSURGE	-0.6	80	V
3	ambient temperature	TS	-40	80	℃

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

Recommended working conditions

No	parameter	Symbol	MIN	TYP	MAX	Units
1	Input DC voltage	VIN	42	48	57	V
2	Low pressure input threshold	VLOCK	37	-	-	V
3	Ambient Temperature	TOP	-40	25	80	℃

- Applicable only to WC-PD30B050 maximum operating temperature

DC Characteristic

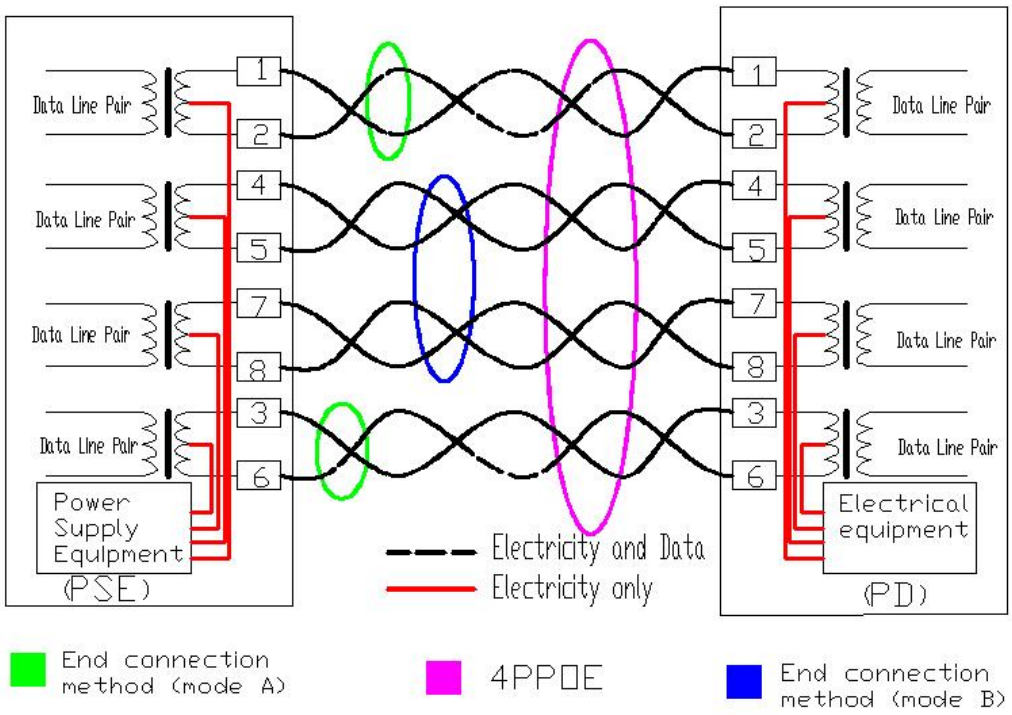
No	parameter	Symbol	MIN	TYP	MAX	Units	Test conditions
1	Standard Output Voltage	VDC	11.7	5	5.2	V	VIN=48v Tc: 25℃
2	Output Current (VIN=48V)	PWR	-	6	-	A	Wide voltage input 42-57V
3	Power adjustment rate	VLINE	-	0.1	-	%	@50% Load
4	Load Adjustment Rate	VLOAD	-	1	-	%	@V_{IN}=48V
5	Ripple Output Noise	VRN	-	200	250	mVp-p	@Maximum Load
6	Minimum Load	RLOAD	10	-	-	mA	
7	Short circuit duration	TSC	-	-	∞	sec	
8	Efficiency (load 80%)	EFF	80	85	-	%	
9	Isolation Voltage (I/O)	VISO	-	-	1500	VPK	
10	temperature coefficient	Tc	-	0.02		%	Per ℃
11	transient response	Ts	-	150	250	ms	VIN=48V VOUT=max

- Typical number is 25 C, nominal voltage is 48V, for auxiliary design only
- Output ripple and noise can be reduced by an external filter, see the application instructions
- If operated under the specified minimum load, the module will emit sound noise, which may cause repeated hiccups in the PSE

Functional Description

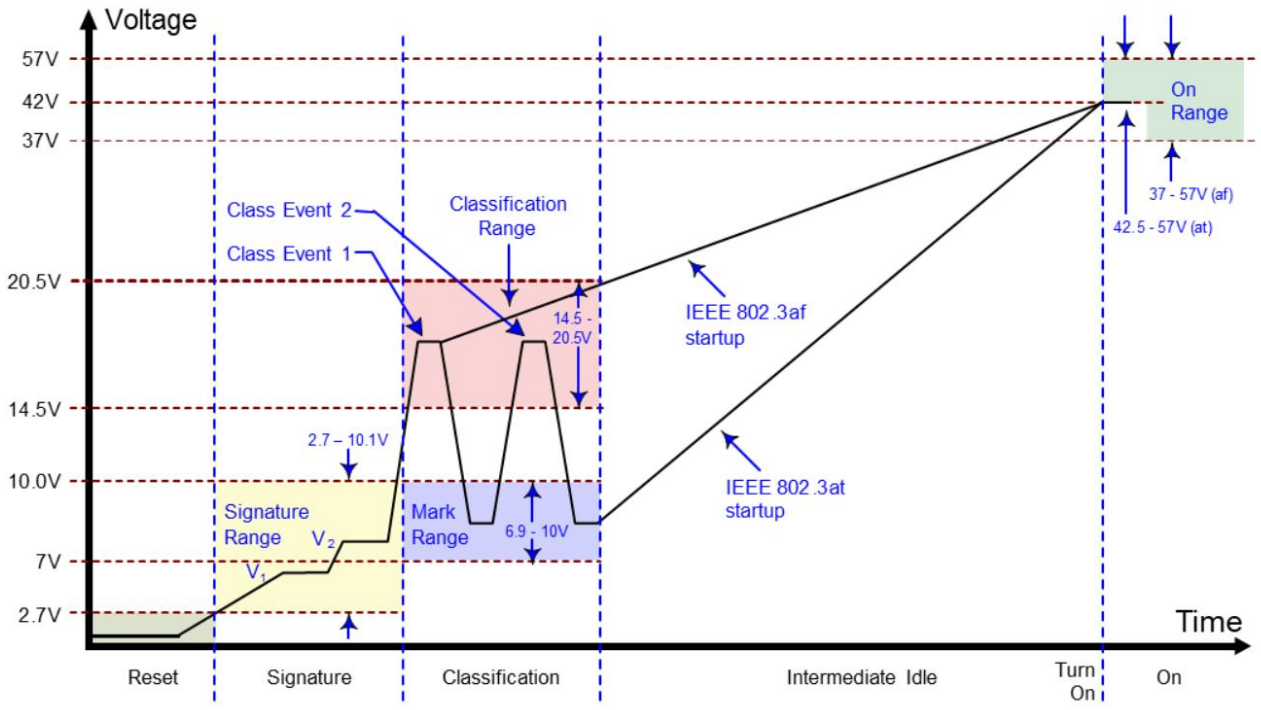
input:

- WC-PD30B050 input end with bridge stack ensures input polarity protection, user can choose the connection mode as needed



PD Power Supply Agreement

- When the module is connected to the cable, it will automatically provide the Power Device (PD) signature to the PSE when needed.The PSE recognizes that the PD is connected to that line and provides power。

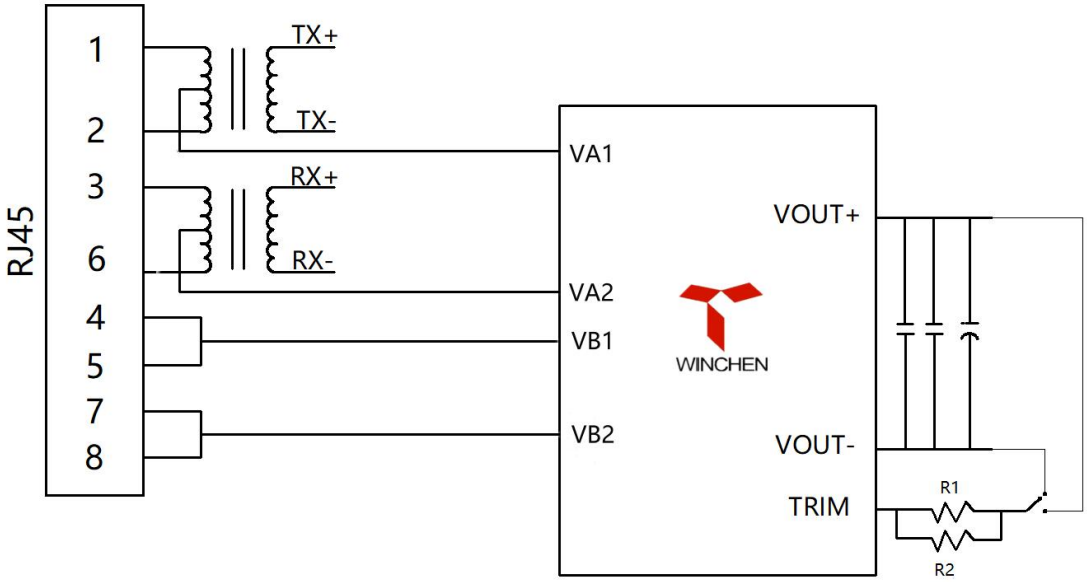


Power Classification:

- WC-PD30B050 uses IEEE802.3at standard and runs with Class 4 (30W) power rating by default
- When using standard Category 6 network cables, under a 30W condition of 10m, the rated power will gradually decrease with the length of the input conductor

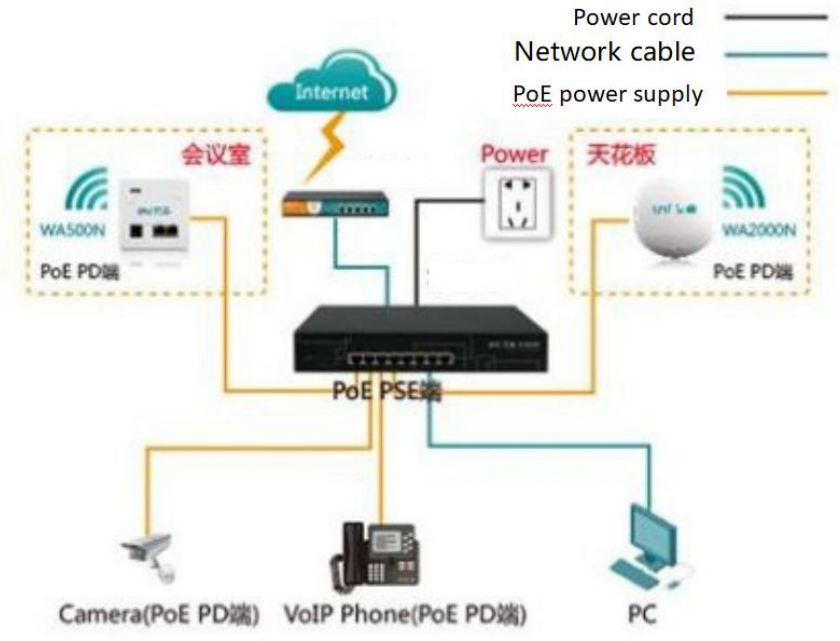
Define criteria	Cable requirements	Grading parameters	Power Supply Characteristics
IEEE802.3at (PoE Plus)	CAT5 cable or CAT6 cable	Maximum power required for Class4 devices is 13W~25.5W	1. The DC voltage ranges from 42 to 57V, with a typical value of 48V. 2. Typical operating current is 10~600mA; typical output power: 25.5W. 3. Class4 rating supported by electrical equipment.
IEEE802.3bt (PoE++)	CAT5 cable or CAT6 cable	The maximum power required for level 5 equipment is 40W	1. DC voltage range 42 V to 57 V, typical value 52V. 2. Typical working current is 10 ~ 1300 mA; typical output power: 71W;
		The maximum power required for level 6 equipment is 51W	
		The maximum power required for level 7 equipment is 62W	
		The maximum power required for level 8 equipment is 71W	

Typical Connection Diagram



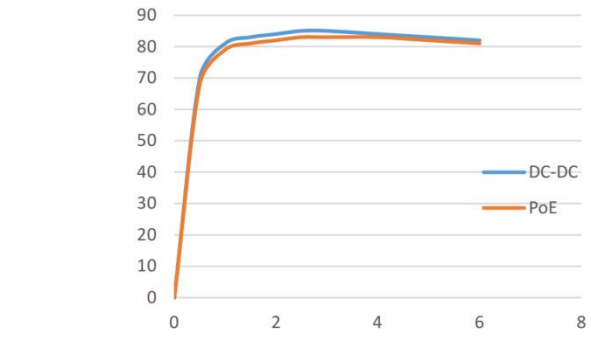
Typical applications

- This module is used in PSE network cable to convert electric energy to DC-DC to the required voltage of equipment without affecting data signal transmission. It conforms to ieee802.3at standard and is used by all equipment terminals

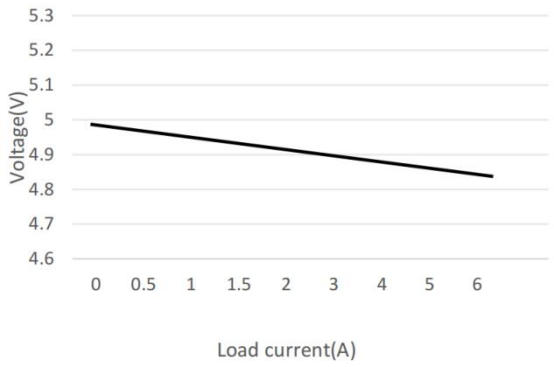


Test waveform diagram

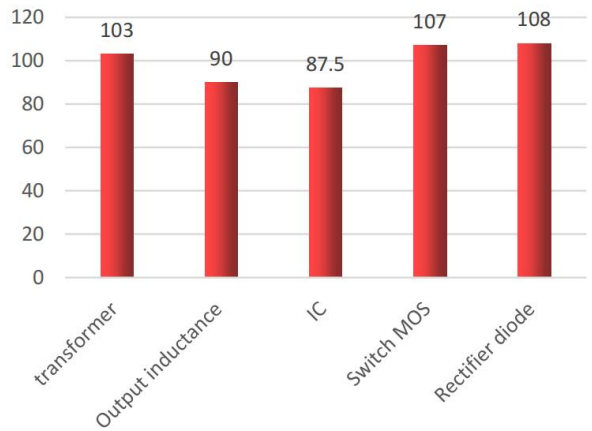
Typical features: Output voltage=5V



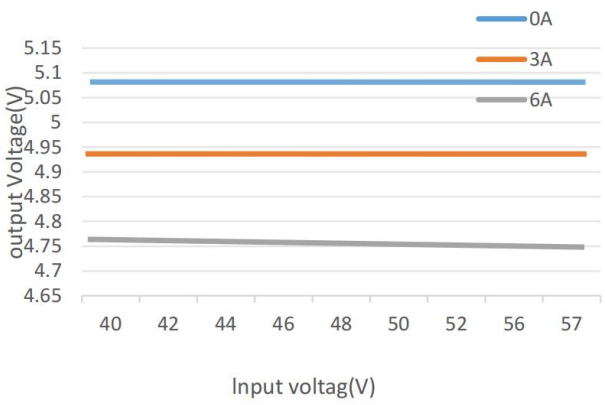
Efficiency (Vout =5V)



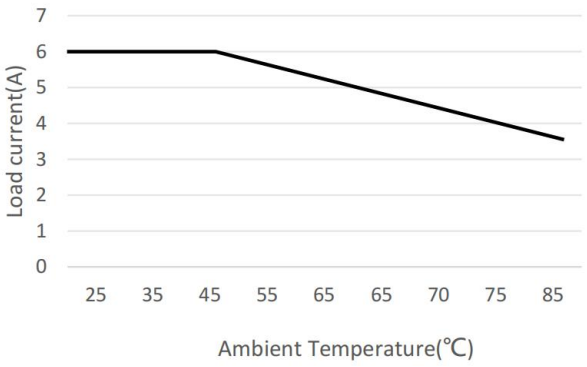
Output current voltage (input 48V)



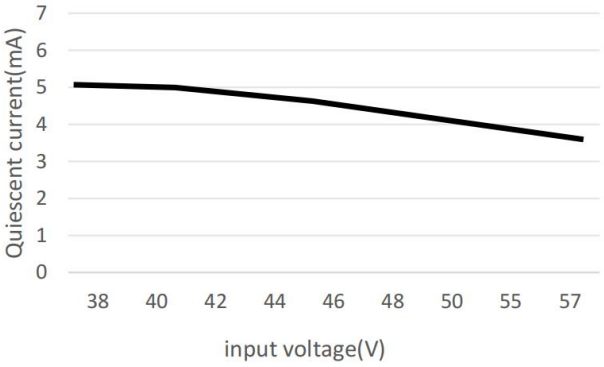
Maximum temperature of components
Conditions (ambient temperature: 27 ℃; output power: 5V / 6A; frequency: 3H)



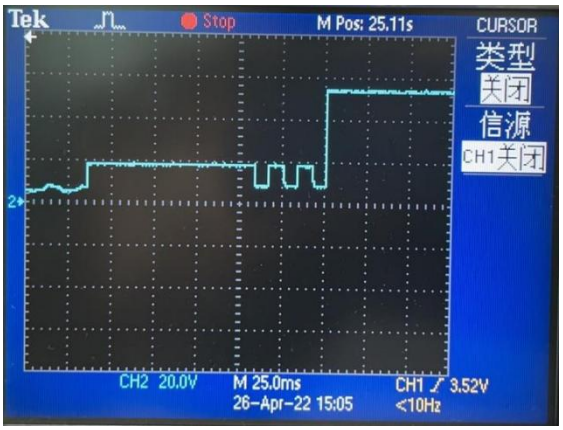
Input voltage & output voltage



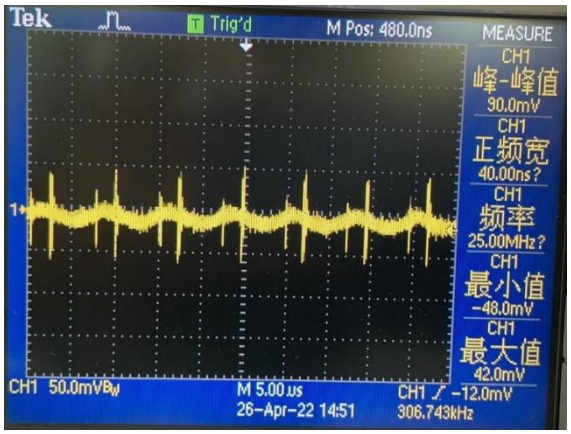
Derating



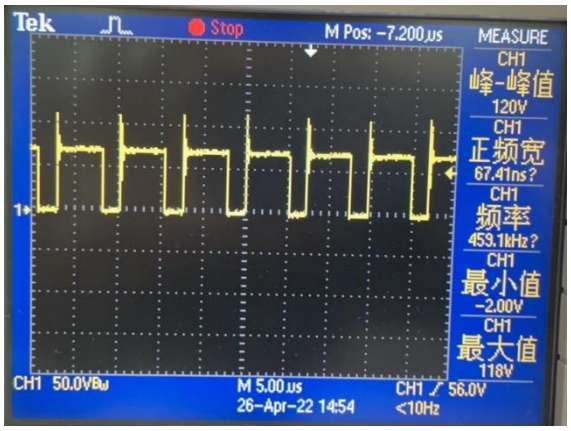
Quiescent current



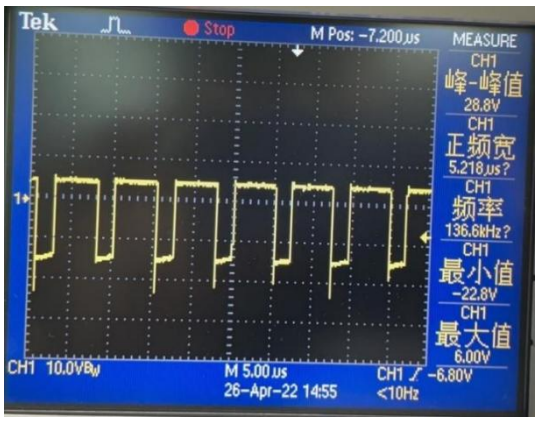
Power on protocol handshake



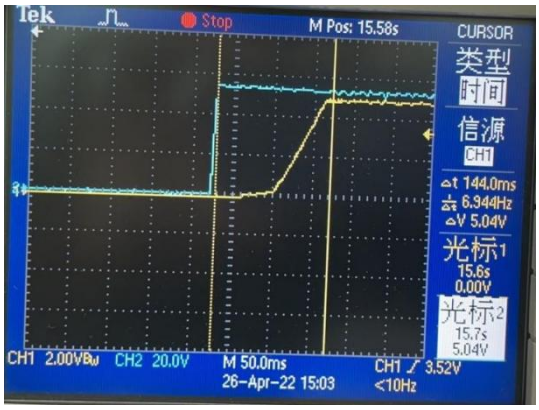
Output ripple (5V/6A)



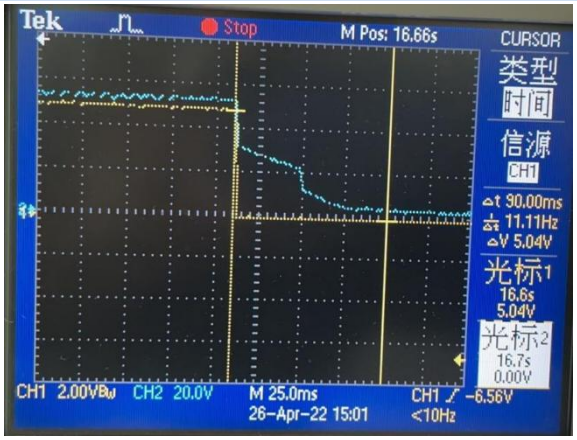
SW switch waveform



Output rectifier diode



Power On



Power Down