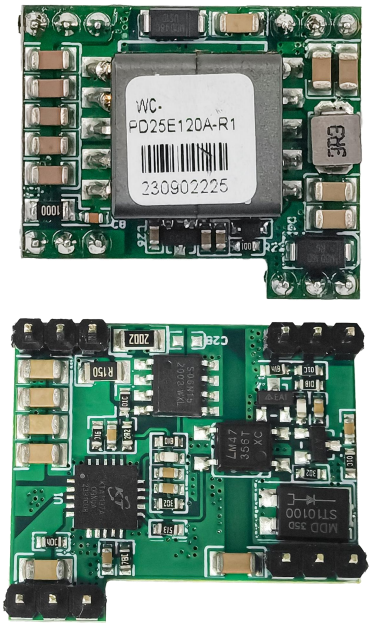
24W PD-12V



Product characteristics

- Compliant with IEEE802.3AT standard (backward compatible with AF)
- 42V~57V wide operating voltage range
- Maximum output power up to 24W; Rated output: 12V/2A
- Output ripple and noise ≤ 150mV
- Conversion efficiency can be as high as 87% (input: 48V output:12V@2A)
- It has excellent reliability and circuit protection such as over current, short circuit, under voltage and surge
- PCB standard size: 23.87 * 27.94 * 16mm
- Class 4 IEEE802.3 PD
- Input/Output: isolate 1500Vdc
- High reliability: The design meets the 5 million hour average failure interval

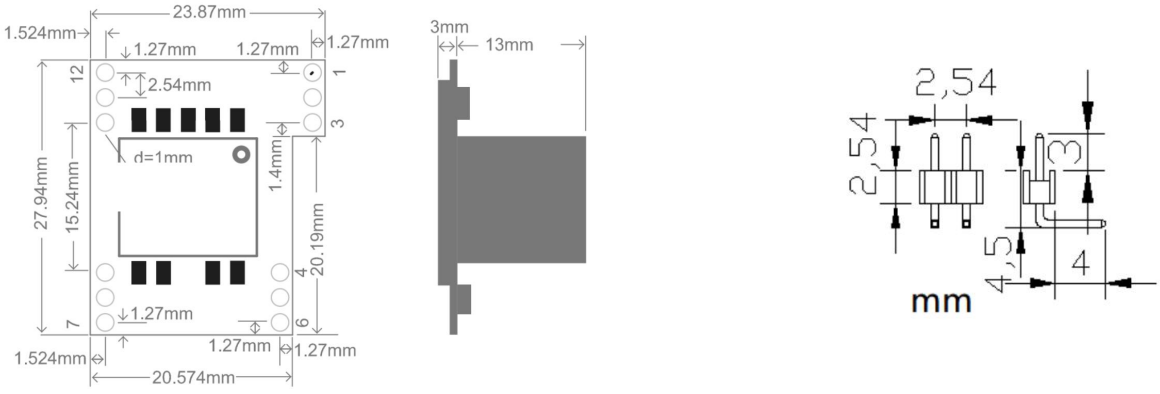
Scope of application

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

Describe

- The WC-PD25E120A-R1 PoE 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 Ethernet cables exceeding Category 5 and 6. The module input complies with the 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 12V. Efficient DC/DC converters can achieve an efficiency of about 87% and operate within a wide input voltage range, with low ripple and low noise output. 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	Vin+	This pin is connected to the input negative (+) power supply using the "middle overlap method", so it needs to be connected to the center tap of the 4/5 network transformer to connect this pin. If the power supply adopts the "end crossing method", it is necessary to connect the center tap of the 1/2 network transformer to this pin
2	NC	Suspended, reserved with fixed pins
3	Vin-	This pin is connected to the input negative (-) power supply using the "middle overlap method", so it needs to be connected to the center tap of the 7/8 network transformer to connect this pin. If the power supply adopts the "end crossing method", it is necessary to connect the center tap of the 3/6 network transformer to this pin
4,5,6	Vout-	This pin is the module output positive pole
7,8,9	Vout+	This pin is the module output negative pole
10,11	Vout-	This pin is the module output positive pole
12	NC	Suspended, reserved with fixed pins

- Since there is no bridge stack access at the power supply input terminal, pay attention to the positive and negative polarity

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	℃

- Only applicable to the maximum operating temperature of WC-PD25E120A-R1 product

DC Characteristic

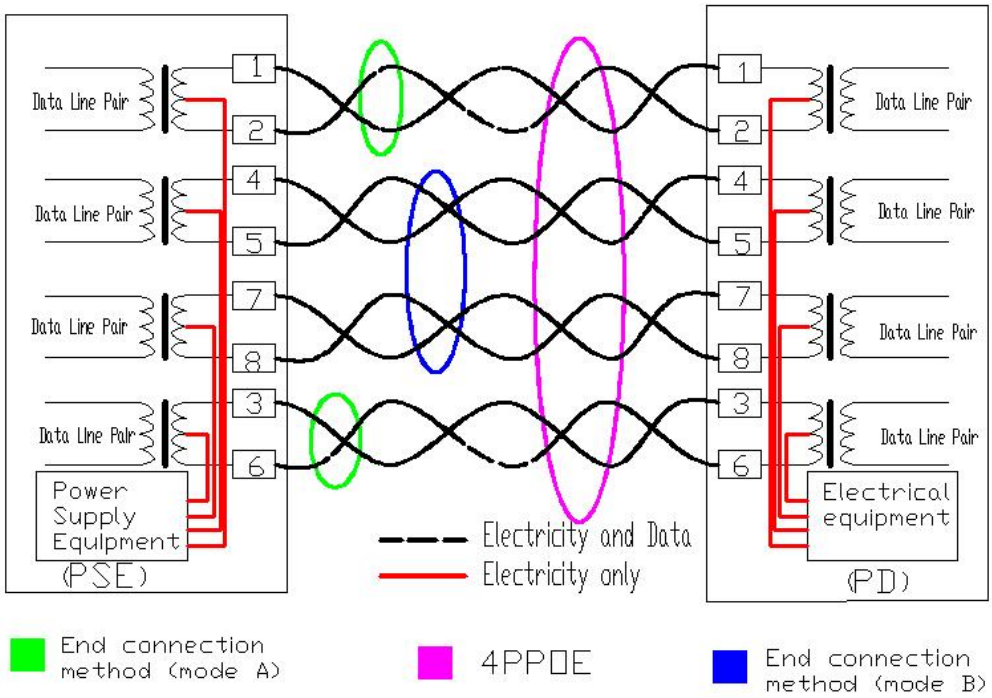
No	parameter	Symbol	MIN	TYP	MAX	Units	Test conditions
1	Standard Output Voltage	VDC	11.75	12.0	12.2	V	VIN=48V Tc: 25℃
2	Output Current (VIN=48V)	PWR	-	2	-	A	Wide voltage input 39-57V
3	Power adjustment rate	VLINE	-	0.1	-	%	@50% Load
4	Load Adjustment Rate	VLOAD	-	1	-	%	@V_{IN}=48V
5	Ripple Output Noise	VRN	-	100	150	mVp-p	@Maximum Load
6	Minimum Load	RLOAD	10	-	-	mA	
7	Short circuit duration	TSC	-	-	∞	sec	
8	Efficiency (load 80%)	EFF	80	84	-	%	
9	Isolation Voltage (I/O)	VISO	-	-	1500	VPK	
10	temperature coefficient	Tc	-	0.02	-	%	Per ℃
11	transient response	Ts	-	100	250	ms	V_{IN}=48V V_{OUT}=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

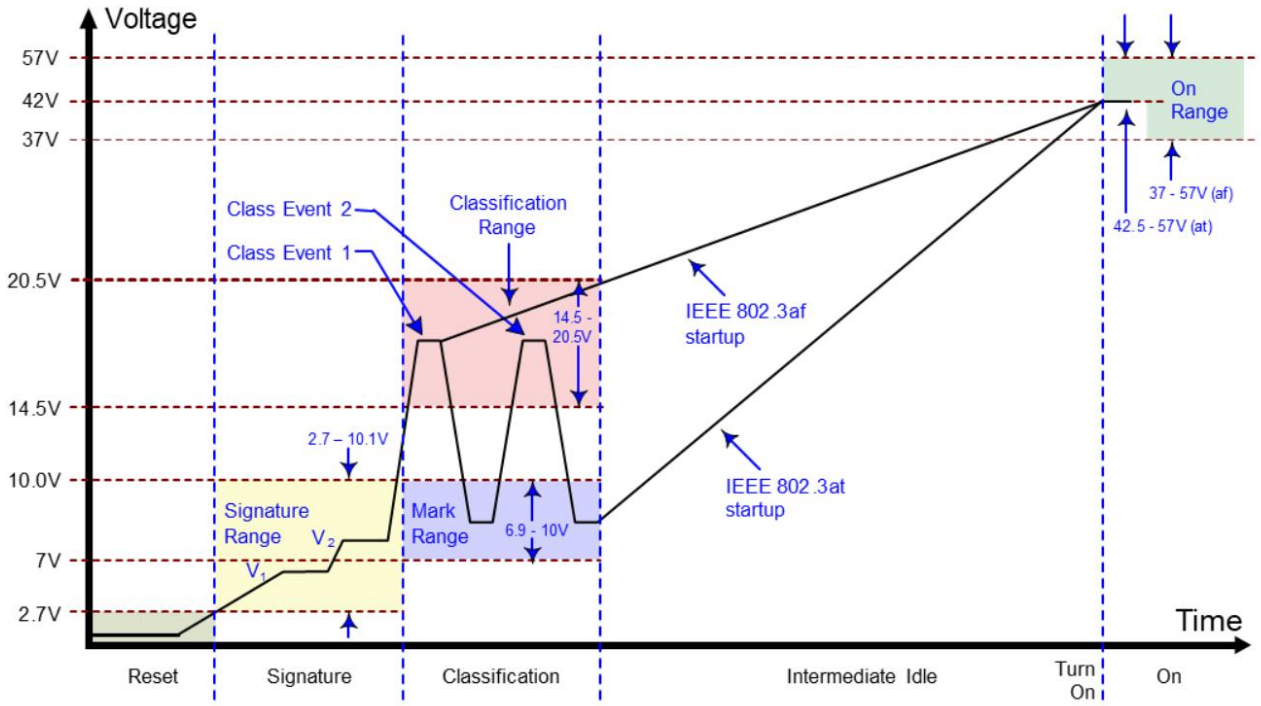
input:

- WC-PD25E120A-R1 input does not come with bridge stacking, users can choose the connection method according to their needs



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

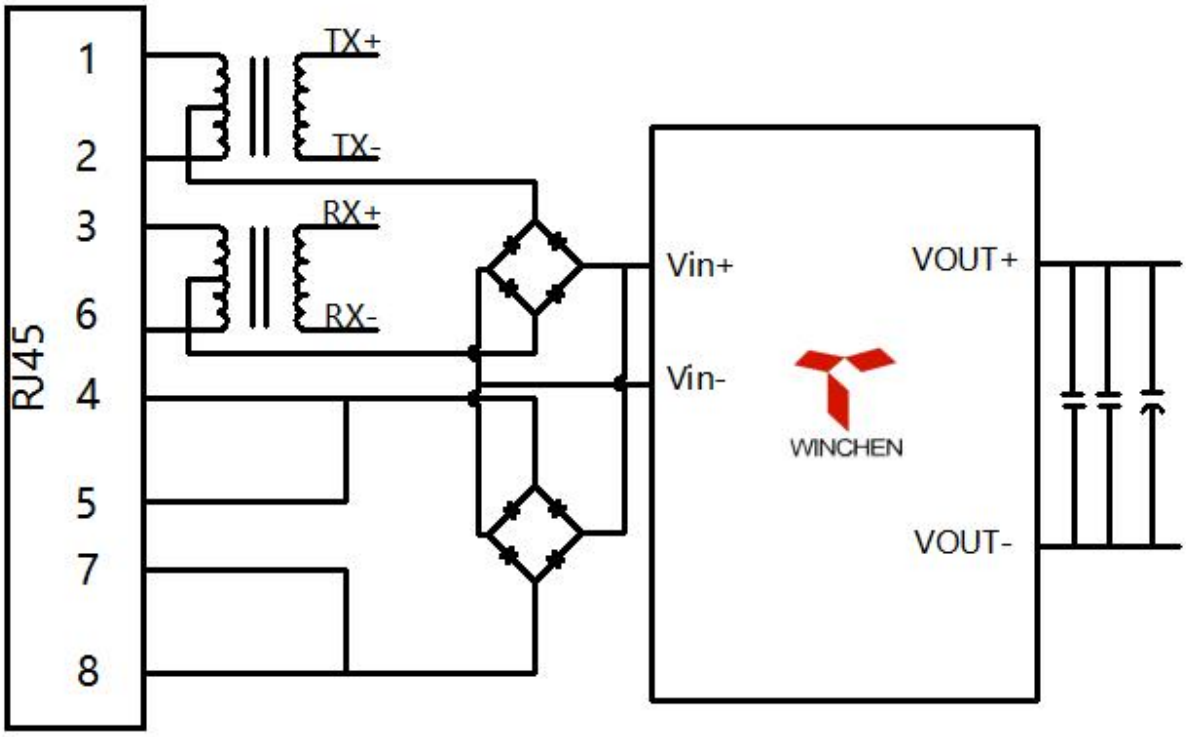


Power Classification:

- WC-PD25E120A-R1 Adopting IEEE802.3AT standard, default class 4 (24W) rated power

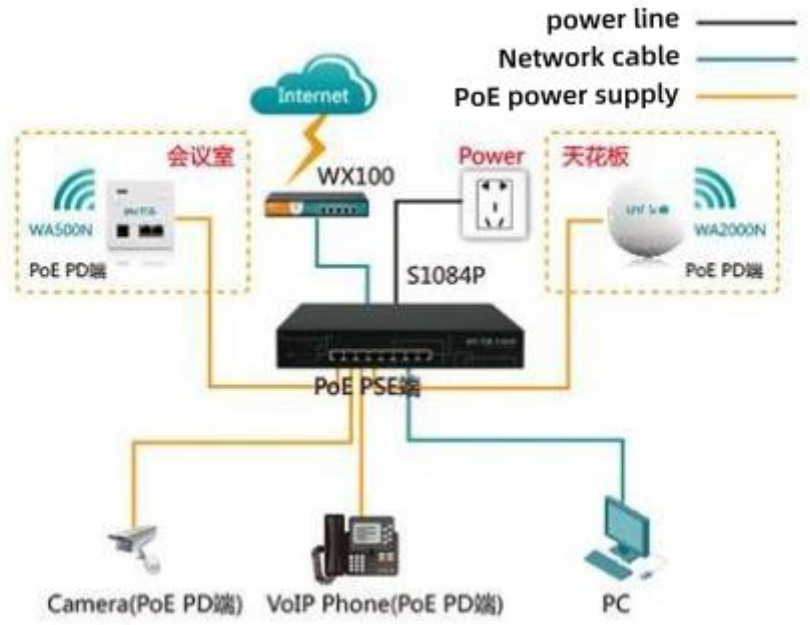
Define criteria	Cable requirements	Grading parameters	Power Supply Characteristics
IEEE802.3at (PoE Plus)	CAT5 cable or CAT6 cable	Maximum power required for Class4 devices is 13W~25.5W	1. The DC voltage ranges from 42 to 57V, with a typical value of 48V 2. Typical operating current is 10~600mA; typical output power: 25.5W 3. Class4 rating supported by electrical equipment.
IEEE802.3af (PoE)	CAT5 cable	Maximum power required for Class0 devices is 0~12.95W	1. The DC voltage ranges from 38 to 57V, with a typical value of 48V 2. Typical operating current is 10~350mA; typical output power: 15.4W 3. The overload detection current is 350~500mA 4. Provide 4 Class Power Requests for PD Devices ranging from 3.84 to 12.95W
		The maximum power required for Class1 devices is 0~3.84W	
		The maximum power required for Class2 devices is 3.85W~6.49W	
		The maximum power required for Class3 devices is 6.5W~12.95W	

Typical Connection Diagram



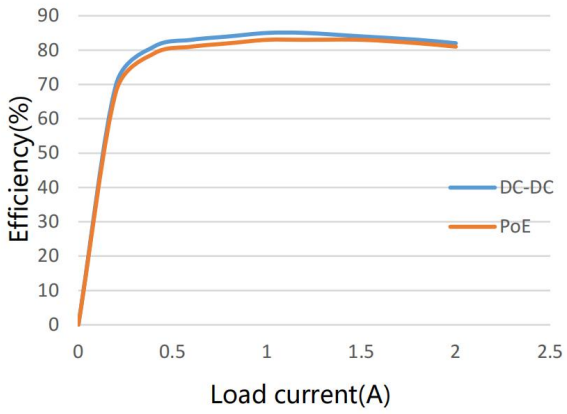
Typical applications

- This module is used in the PSE network cable to convert electrical energy into the voltage required for DC-DC to the device without affecting data signal transmission. Compliant with IEEE802.3AT standard, used by all device terminals

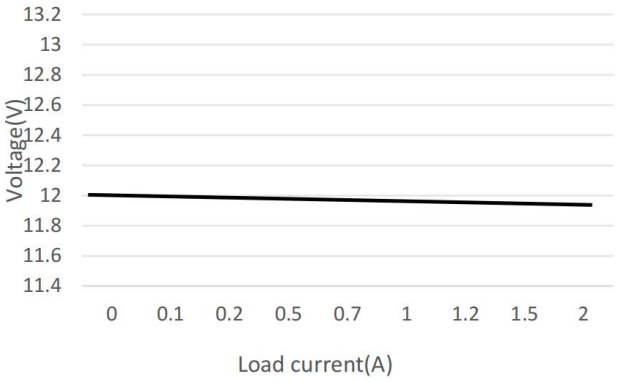


Test waveform diagram

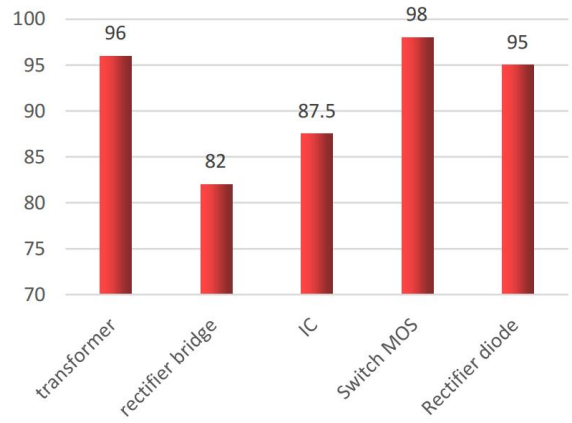
Typical features: Output voltage=12V



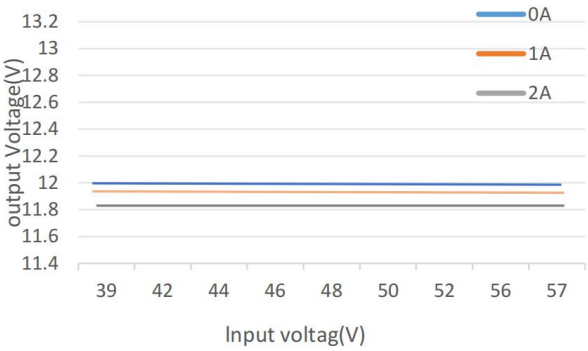
Efficiency (Vout =12V)



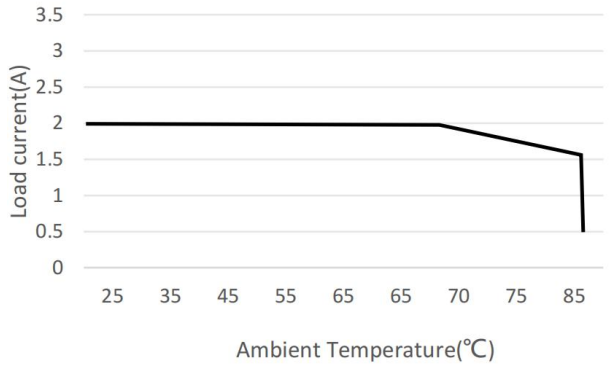
Output current voltage (input 48V)



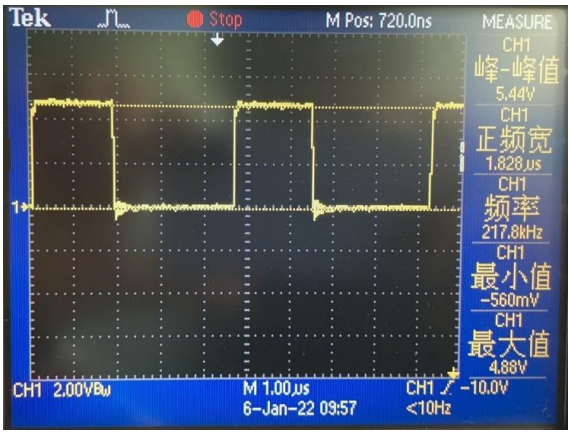
Maximum temperature conditions for components (ambient temperature: 27 ° C; output power: 12V/2A; time: 3H)



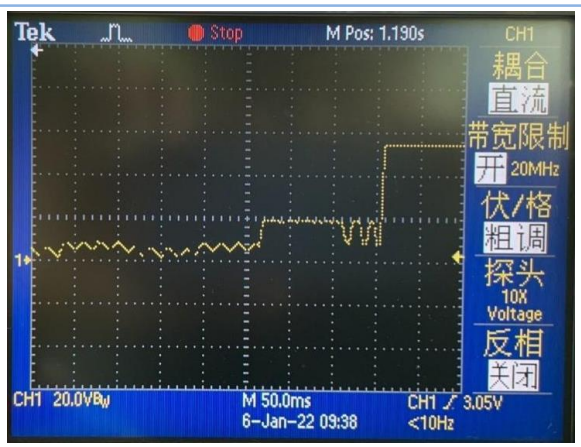
Input voltage & output voltage



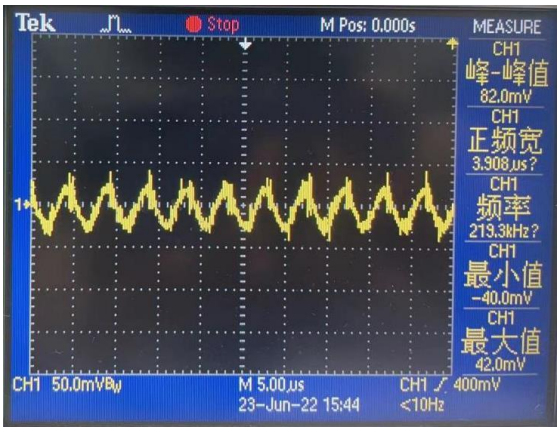
Derating



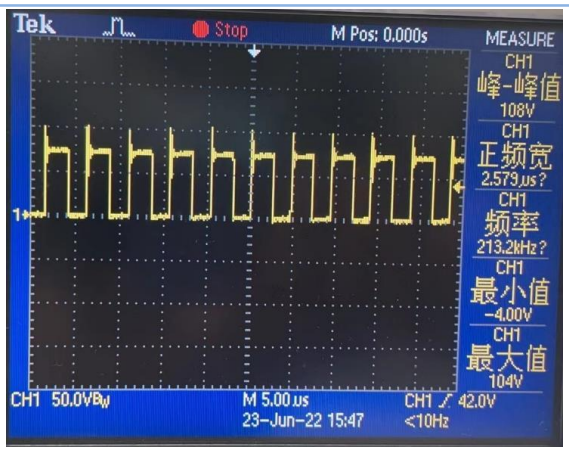
PMW



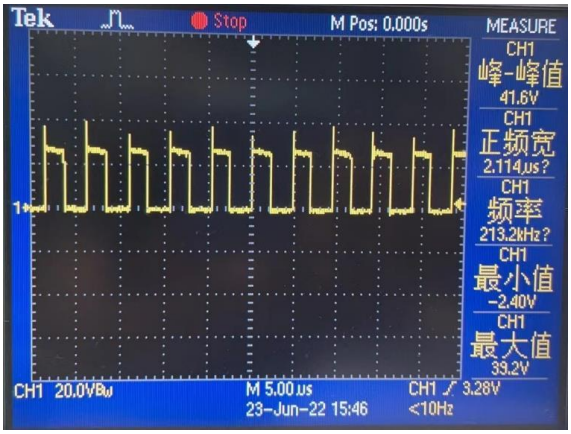
Power on protocol handshake



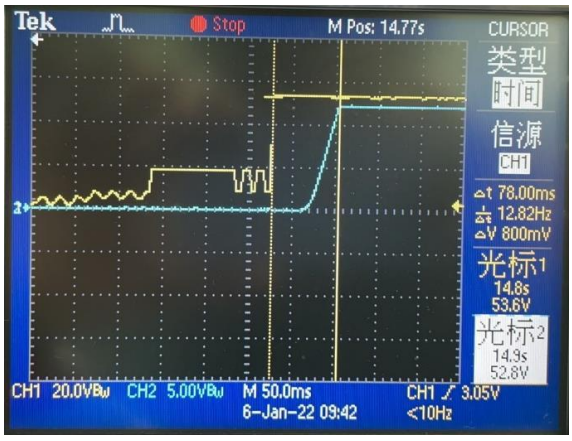
Output ripple (12V / 2A&470uF)



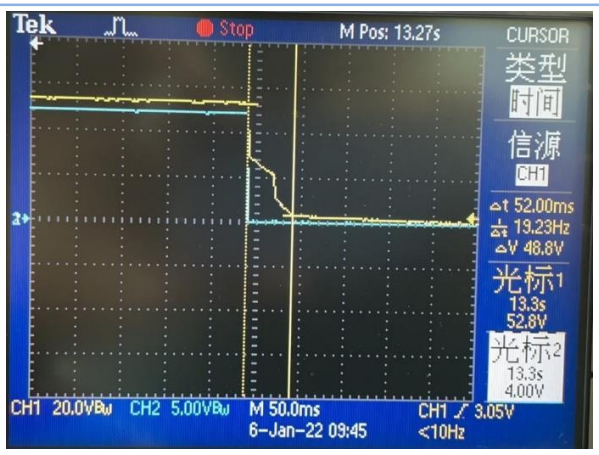
SW switch waveform



Output rectifier diode



Power On



Power Down