



AiP3326H

16-Channel High Voltage LED Driver and Controller with Constant Current

Product Specification

Specification Revision History:

Version	Date	Description
2024-11-A0	2024-11	New
2025-02-A1	2025-02	Modify the parameters
2026-07-A2	2026-07	Add QFN24 package form



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1、General Description

AiP3326H is a high-precision constant current LED driver chip. It contains 16-channel constant current cathode driver output.

AiP3326H can provide accurate constant current driver output and ensure the current offset between channels within 3.0% and the current offset between chips within 4.0%.

Features:

- Supply voltage: 3.3V to 5.0V (10%)
- 5 to 45mA constant current output (at 5V)
- 5 to 30mA constant current output (at 3.3V)
- Constant current output operating voltage: $-0.3V \sim 14V$
- Maximum tolerable output voltage: 17V
- $\pm 3.0\%$ (maximum) DC current difference between channels
- $\pm 4.0\%$ (maximum) DC current difference between chips
- Provide output enable control signal to realize software PWM dimming
- Feature the external resistor to adjust the output constant current
- Packaging information: SOP24/SSOP24(0.635mm)/QFN24

Ordering Information:

Reel packing specifications:

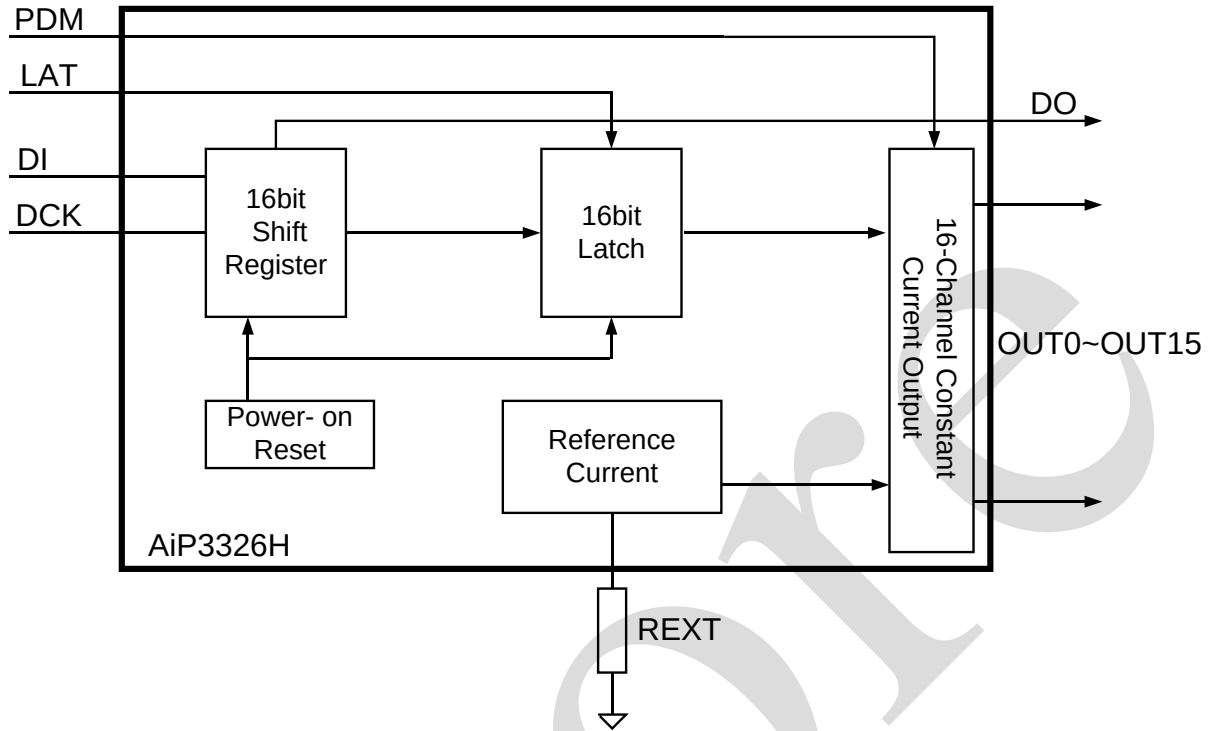
Part number	Packaging form	Marking code	Reel quantity	Boxed reel quantity	Notes
AiP3326HSA24.TR	SOP24	AiP3326H	1250PCS/reel	1250PCS/box	Dimensions of plastic enclosure: 15.4mm×7.5mm Pin spacing: 1.27mm
AiP3326HVB24.TR	SSOP24	AiP3326H	4000PCS/reel	8000PCS/box	Dimensions of plastic enclosure: 8.7mm×3.9mm Pin spacing: 0.635mm
AiP3326HQB24.TR	QFN24	AiP3326H	4000PCS/reel	8000PCS/box	Dimensions of plastic enclosure: 4.0mm×4.0mm Pin spacing: 0.5mm

Note: If the physical information is inconsistent with the ordering information, please refer to the actual product.

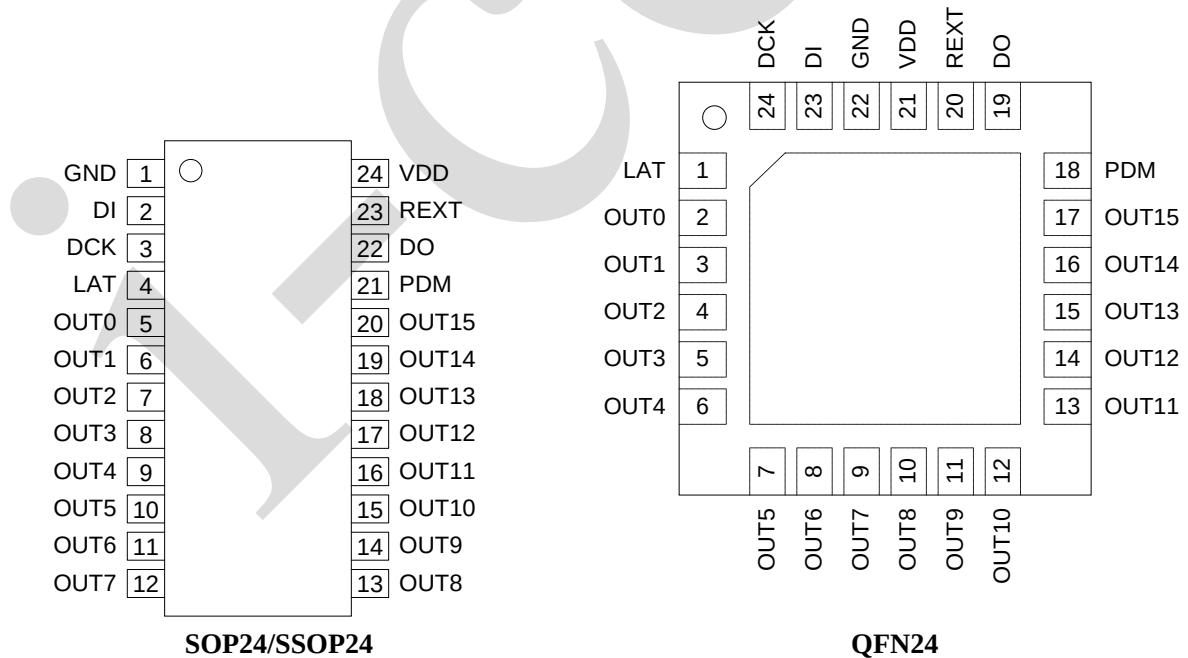


2、Block Diagram And Pin Description

2.1、Block Diagram



2.2、Pin Configurations





2.3、Pin Description

Pin No.		Pin Name	Description
SOP24/SSOP24	QFN24		
1	22	GND	ground
2	23	DI	serial data input
3	24	DCK	serial clock input
4	1	LAT	data latch control
5~20	2~17	OUT0~OUT15	constant current output
21	18	PDM	output PWM control
22	19	DO	serial data output
23	20	REXT	constant current adjustment resistor
24	21	VDD	reference power supply

3、Electrical Parameter

3.1、Absolute Maximum Ratings

($T_{amb}=25^{\circ}\text{C}$, $T_{j(max)}=150^{\circ}\text{C}$, unless otherwise specified)

Characteristic	Symbol	Value	Unit
supply voltage	VDD	-0.3 to +7.0	V
maximum constant output current	I_{OUT}	45	mA
input voltage	VIN	-0.3 to VDD+0.3	V
instantaneous withstand voltage	VOUT	-0.3 to 17	V
operating voltage	VOUT	-0.3 to 14	V
maximum serial clock frequency	F_{DCK}	30	MHZ
operating temperature	T_{amb}	-40 to +85	$^{\circ}\text{C}$
storage temperature	T_{stg}	-65 to +150	$^{\circ}\text{C}$
soldering temperature (10s)	T_L	260	$^{\circ}\text{C}$

Note:

1) Operating above these specified values may cause permanent damage to the components. Extending the operation period under the absolute maximum condition may reduce the reliability of the component. These are only part of the specified values, and functional operations under other conditions outside the specifications are not supported.

2) All voltage is referenced to the ground.



3.2、Electrical Characteristics

3.2.1、DC Characteristics

(VDD=3.3V to 5V, T_{amb}=-40 to 85℃, unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
HIGH-level input voltage	V _{IH}	-	0.7*VDD	-	VDD	V
LOW-level input voltage	V _{IL}	-	GND	-	0.3* VDD	V
current offset (between channels)*	DIOUT1	V _{OUT} =1V R _{EXT} =3.69KΩ	-	±1.5	±3.0	%
current offset (between chips)*	DIOUT2		-	±1.5	±4.0	%
current offset VS output voltage	%/V _{OUT}	V _{OUT} =1V to 3V R _{EXT} =0.94KΩ	-	±0.1	±0.5	% / V
current offset VS power supply voltage	%/VDD	V _{OUT} =3V to 5.5V R _{EXT} =0.94KΩ	-	±0.6	±1	
Operating current*3	I _{DD1} (off)	R _{EXT} =3.69KΩ all output off	-	4.0	8.0	mA
	I _{DD2} (on)	R _{EXT} =3.69KΩ all output on	-	8.0	16.0	
	I _{DD3} (off)	R _{EXT} =0.94KΩ all output off	-	5.0	10.0	
	I _{DD4} (on)	R _{EXT} =0.94KΩ all output on	-	9.0	18.0	
	I _{DD3} (off)	R _{EXT} suspended all output on	-	2.0	5.0	

Note:

* Constant current offset(between channels): the comparison deviation between the average output constant current of a single channel and the average output constant current of all channels.

* Constant current offset(between chips): comparison deviation between the average output constant current of all channels of Chip 1 and the average output constant current of all channels of Chip 2.

* Operating current: any LED is not connected when measuring.

3.2.2、AC Characteristics

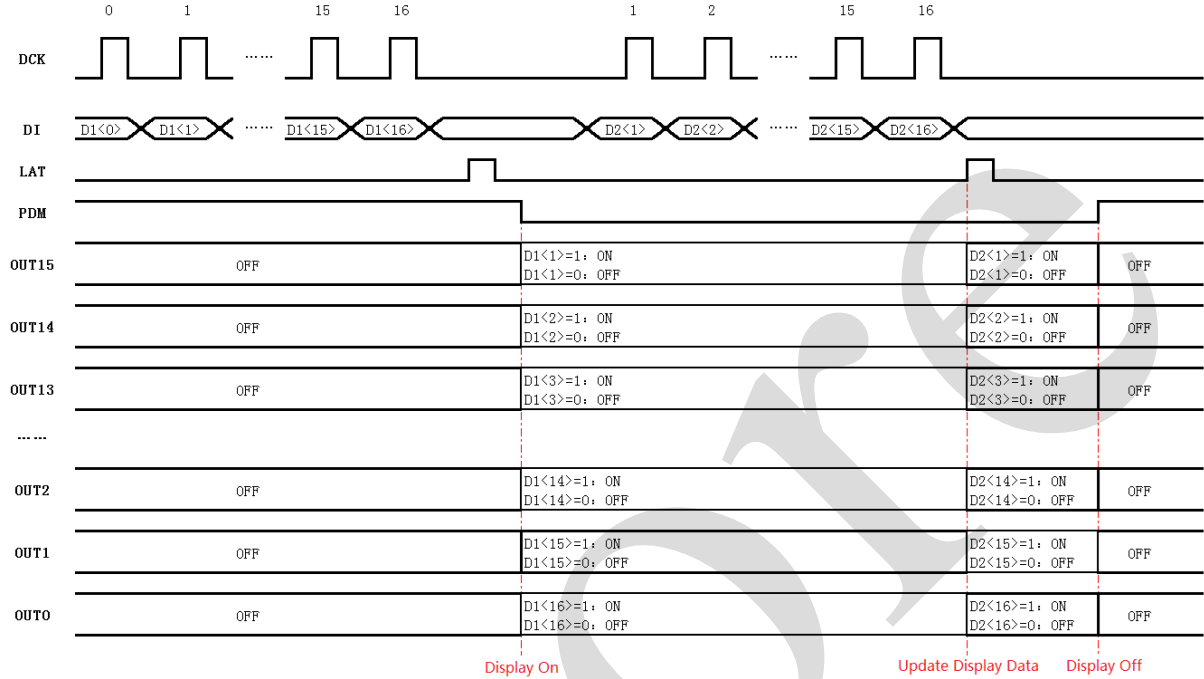
(T_{amb}=25℃, VDD=3.3V to 5V, unless otherwise specified)

Parameter		Symbol	Conditions	Min.	Typ.	Max.	Unit
rise time	PDM-to-OUT0	t _{PLH1}	V _{IH} =VDD V _{IL} =GND R _{EXT} =1820Ω V _L =5V R _L =330Ω C _L =13pF	-	-	-	ns
	DCK-DO	t _{PLH3}		-	35	-	
fall time	PDM-to-OUT0	t _{PHL1}		-	-	-	
	DCK-DO	t _{PHL3}		-	35	-	
pulse width	PDM	t _{W(PDM)}		120	-	-	
	LAT	t _{W(LAT)}		20	-	-	
	DCK	t _{W(DCK)}		15	-	-	
set-up time	LAT	t _{SU(LAT)}		5	-	-	
	DI	t _{SU(D)}		3	-	-	
hold time	LAT	t _{H(LAT)}		20	-	-	
	DI	t _{H(D)}		4	-	-	
DO rise time		t _{R(DO)}		-	20	-	



DO fall time	$t_{F(DO)}$	-	20	-
rise time of voltage output (current off)	t_{or}	-	55	-
fall time of voltage output (current on)	t_{of}	-	50	-

Timing Diagram



Truth Table

Input				Latch Data	Output	
DCK	DI	LAT	PDM		DO	OUT0... OUT7 ... OUT15
↑	D16	L	--	Hold	D_{n-15}	(controlled by PDM)
↑	D16	H	--	D[16:1]	D_{n-15}	
↑	D16	--	L	(controlled by LAT)	D_{n-15}	ON/OFF state corresponding to latch data
↑	D16	--	H		D_{n-15}	OFF



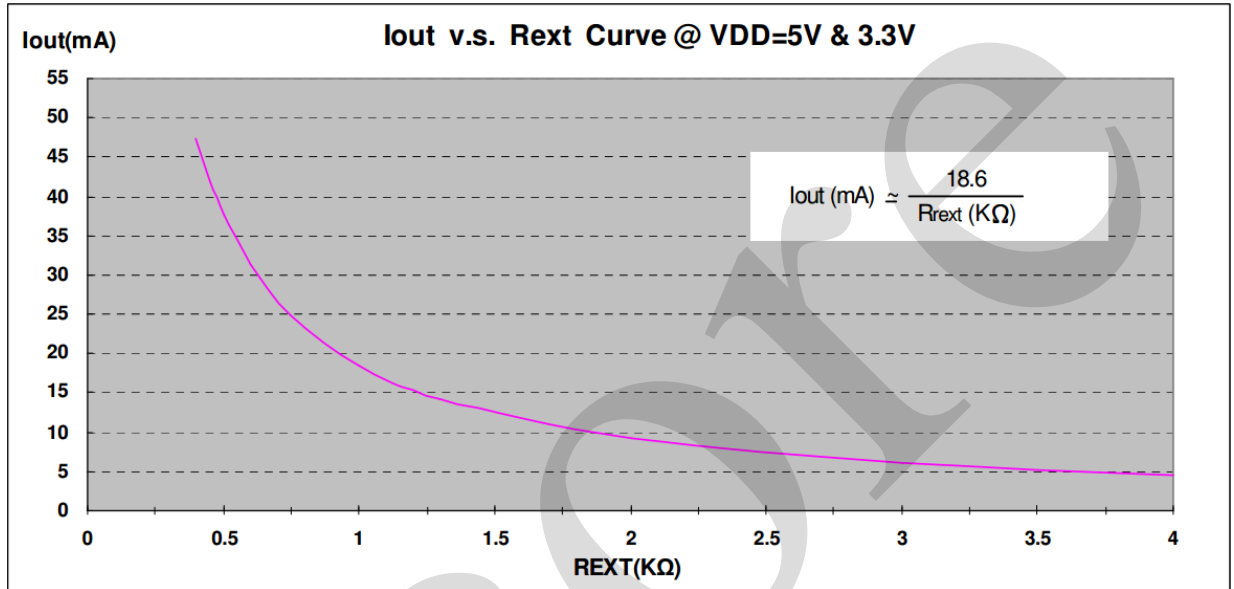
4、Function Description

4.1、Adjust The Output Current

The constant current is determined by the external resistance across REXT. The current value can be calculated with the following formula:

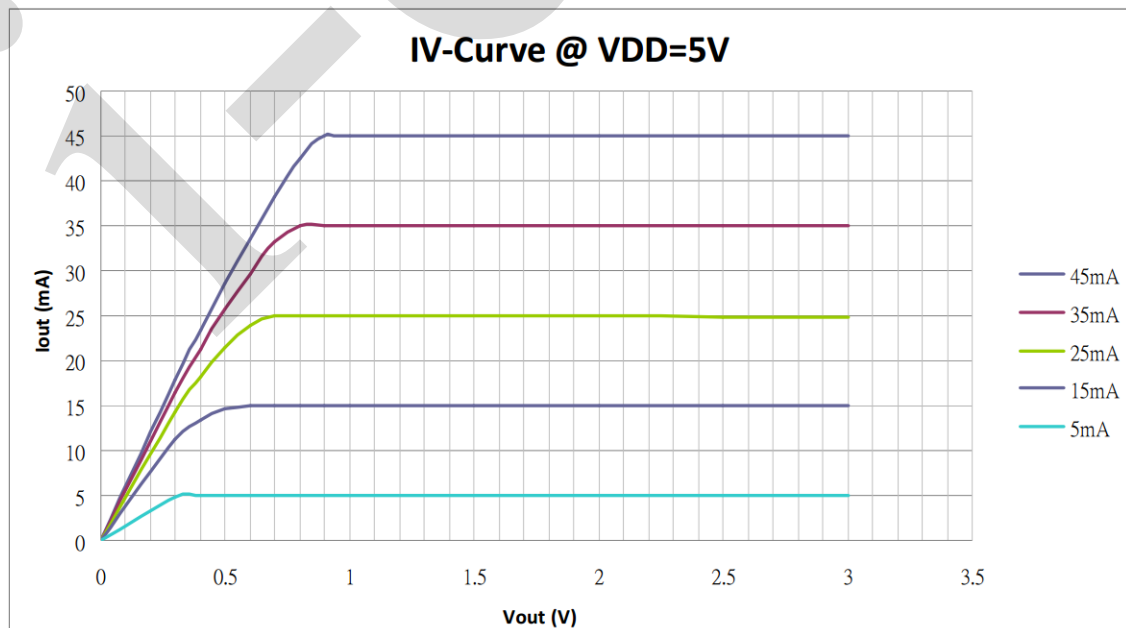
$$I_{OUT}(mA) = \frac{18.6}{R_{EXT}(K\Omega)}$$

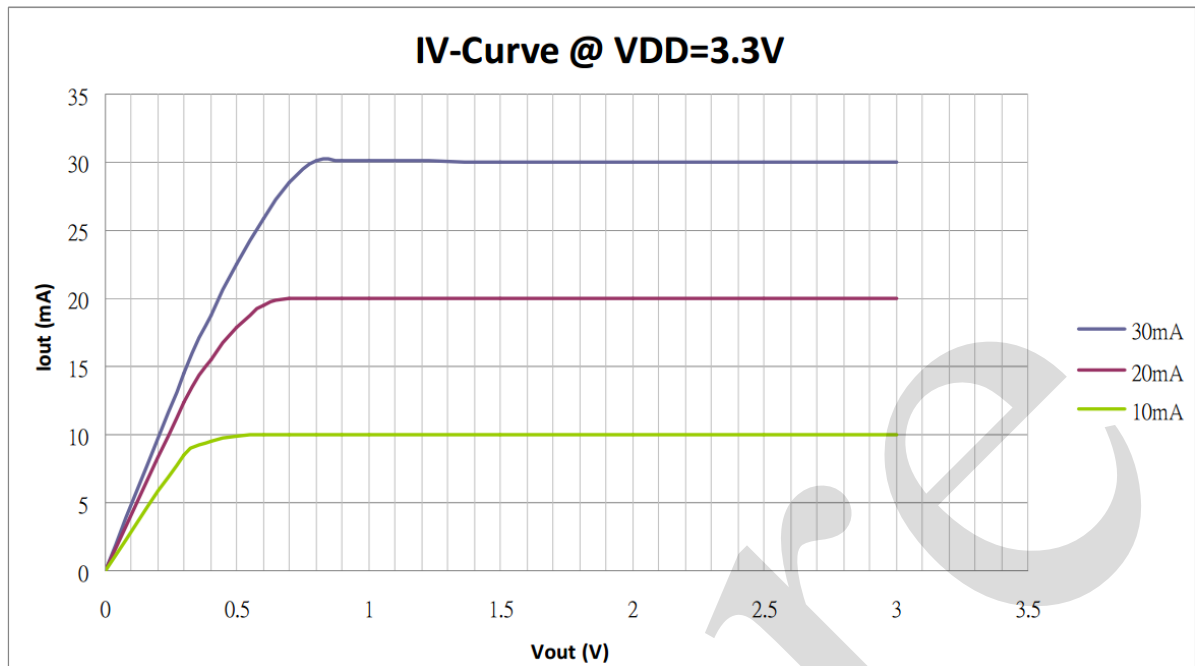
For example: When $R_{EXT}=930\Omega$, $I_{OUT}\approx 20mA$



4.2、Constant Current Output Characteristics

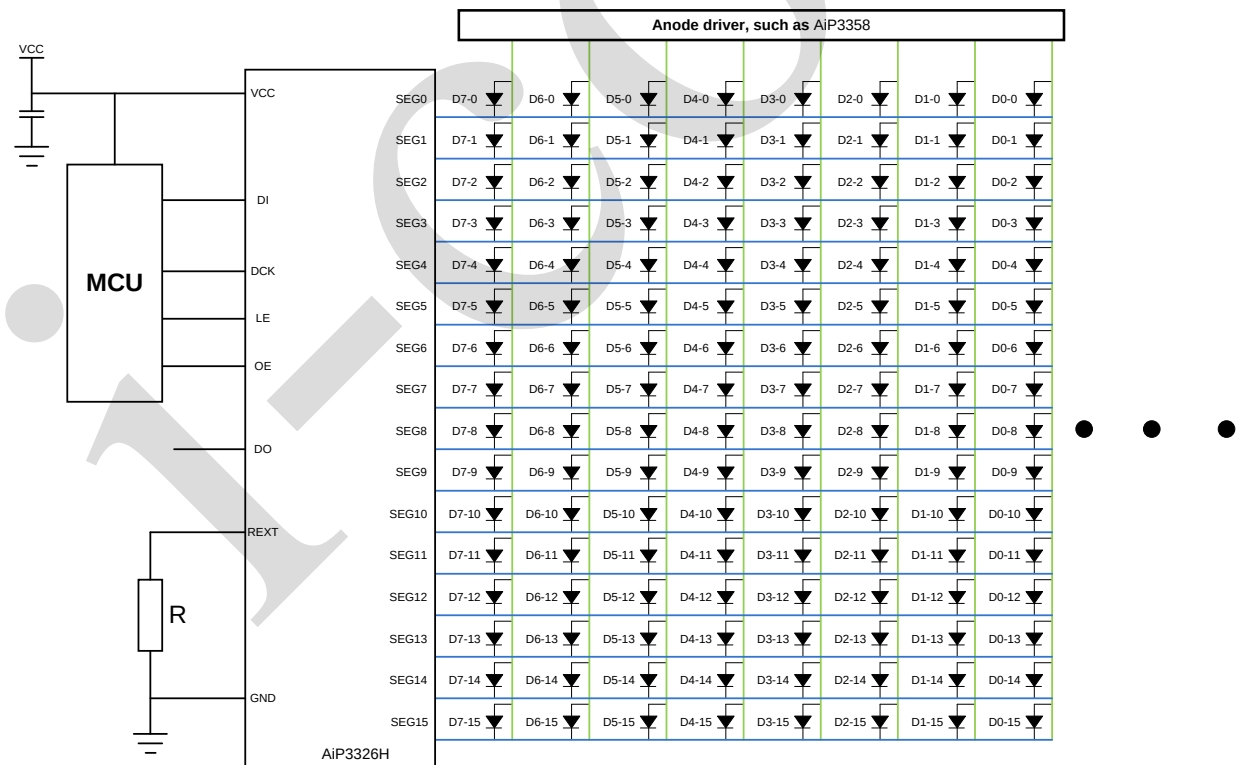
The steady-state output current will hardly be affected by the output voltage, so AiP3326H can still provide accurate constant current output under different LED forward voltages. The following figure describes how to design an appropriate output voltage to achieve the best constant current characteristics.





*恒流输出端口电压可高于供电电压

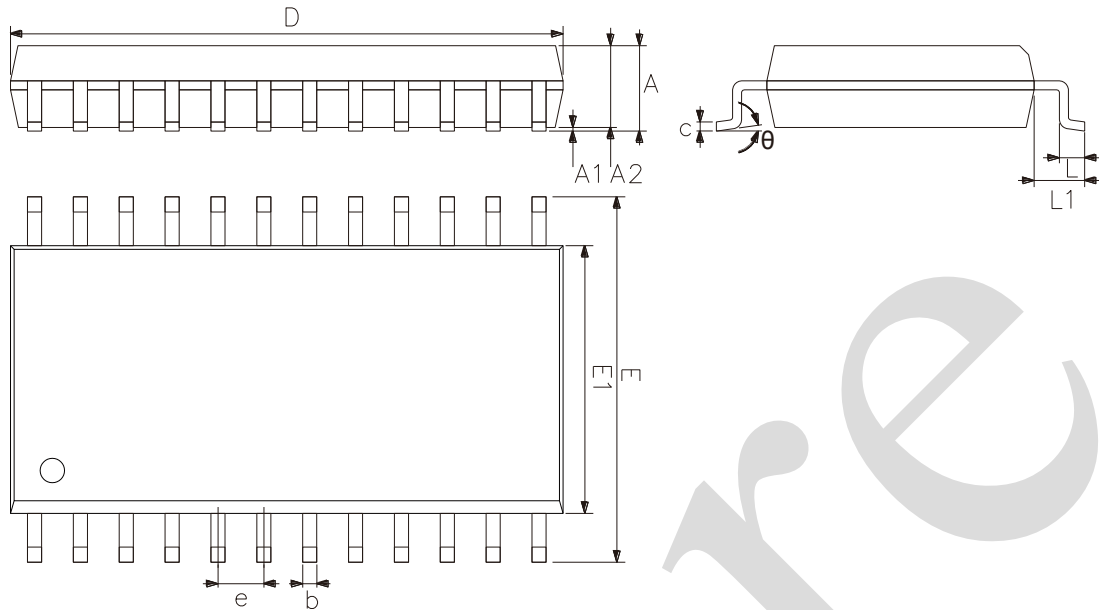
5、Typical Application Circuit





6、Package Information

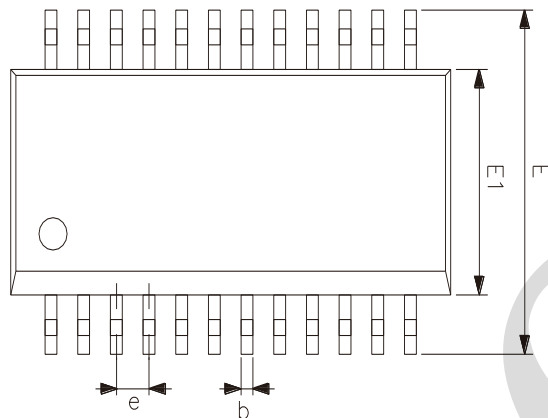
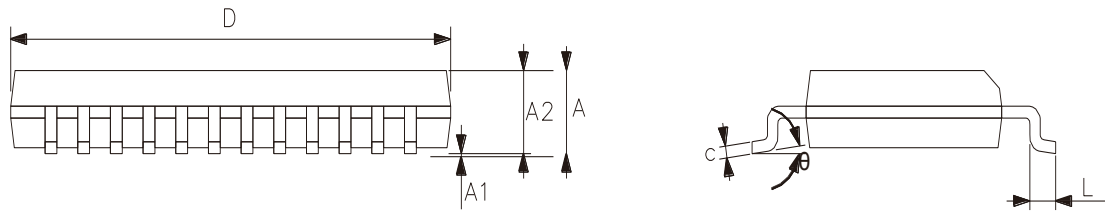
6.1、SOP24



2023/12/A	Dimensions In Millimeters	
Symbol	Min.	Max.
A	2.35	2.65
A1	0.10	0.30
A2	2.13	2.44
b	0.39	0.47
c	0.25	0.30
D	15.19	15.55
E	10.10	10.57
E1	7.40	7.62
e	1.27	
L	0.41	1.00
L1	1.30	1.50
θ	0°	8°



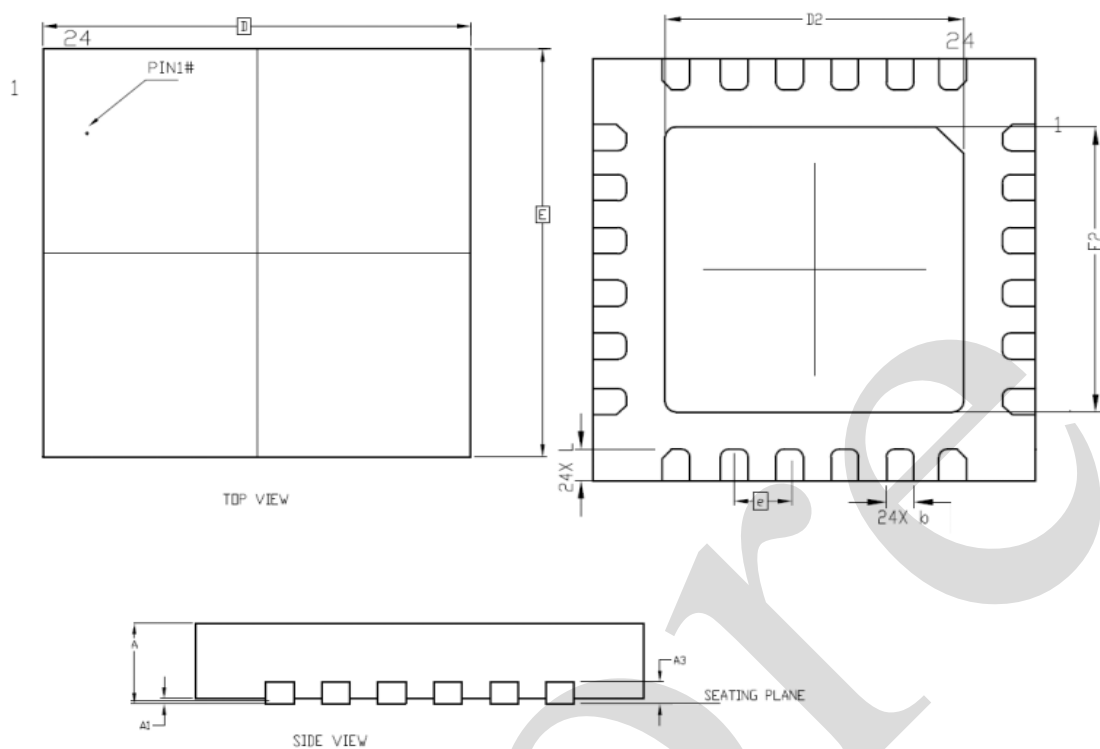
6.2、SSOP24 (0.635mm)



2023/12/A	Dimensions In Millimeters	
Symbol	Min	Max
A	1.35	1.75
A1	0.10	0.25
A2	1.30	1.55
b	0.23	0.47
c	0.19	0.26
D	8.45	8.85
E	5.80	6.20
E1	3.70	4.10
e	0.635	
L	0.40	0.80
θ	0°	8°



6.3、QFN24



2026/02/C	Dimensions In Millimeters	
Symbol	Min.	Max.
A	0.70	0.80
A1	0	0.05
A3	0.15	0.20
b	0.18	0.30
D	3.90	4.10
E	3.90	4.10
D2	2.20	2.80
E2	2.20	2.80
e	0.50	
L	0.25	0.45



7、Statements And Notes

7.1、The name and content of Hazardous substances or Elements in the product

Part name	Hazardous substances or Elements									
	Lead and lead compounds	Mercury and mercury compounds	Cadmium and cadmium compounds	Hexavalent chromium compounds	Polybrominated biphenyls	Polybrominated biphenyl ethers	Dibutyl phthalate	Butylbenzyl phthalate	Di-2-ethylhexyl phthalate	Diisobutyl phthalate
Lead frame	○	○	○	○	○	○	○	○	○	○
Plastic resin	○	○	○	○	○	○	○	○	○	○
Chip	○	○	○	○	○	○	○	○	○	○
The lead	○	○	○	○	○	○	○	○	○	○
Plastic sheet installed	○	○	○	○	○	○	○	○	○	○
explanation	○: Indicates that the content of hazardous substances or elements in the detection limit of the following the SJ/T11363-2006 standard. ×: Indicates that the content of hazardous substances or elements exceeding the SJ/T11363-2006 Standard limit requirements.									

7.2、Notes

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